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BEFORE THE
SURFACE TRANSPORTATION BOARD

Ex Parte No. 431 (Sub No. 4)

REVIEW OF THE GENERAL PURPOSE COSTING SYSTEM

JOINT COMMENTS OF
THE AMERICAN CHEMISTRY COUNCIL;
THE CHLORINE INSTITUTE; AND
THE FERTILIZER INSTITUTE

The American Chemistry Council, The Chlorine Institute, and The Fertilizer Institute, (collectively the "Interested Parties") hereby submit these Joint Comments in response to the August 4, 2016 Supplemental Notice of Proposed Rulemaking ("SNPR") issued by the Surface Transportation Board ("STB" or "Board") in the above-captioned proceeding. The SNPR revises a previous Notice of Proposed Rulemaking served on February 4, 2013, in which the Board proposed to adjust how the Uniform Railroad Costing System ("URCS") calculates certain system-average unit costs, ostensibly to better reflect railroad operations and to automatically reflect economies of scale as shipment size increases without needing to apply the so-called "make-whole" adjustment that is part of the current URCS formula. The Board also proposed various related changes to URCS intended to produce more accurate movement costs. Rail and shipper stakeholders alike, including these Interested Parties, expressed significant concerns with the Board's original proposals. The Interested Parties continue to have concerns with the revised proposals in the SNPR, which will have significant ramifications for how and when the Board exercises its regulatory authority.

FILING CONTAINS COLOR IMAGES

The Interested Parties submit their comments through the attached Verified Statement of Robert D. Mulholland, Senior Vice President of L.E. Peabody & Associates, Inc. Mr. Mulholland provides context for his testimony, in Part II of his verified statement, by first describing the current URCS model, the three categories of shipment types, and the purpose of the URCS Phase III adjustments. After providing this background, Mr. Mulholland addresses multiple deficiencies and/or flaws in the Board's proposals.

In Part III, Mr. Mulholland notes that, although the Board professes to eliminate the make-whole adjustment, all it really has proposed is to change the way that adjustment is distributed across and within the three shipment types. While the Board claims that its proposed model has been designed to maintain the cost relationships reflected in the current URCS Phase III adjustments, Mr. Mulholland shows that the Board's model completely discards those relationships for all shipment sizes above and below 75 cars. Moreover, the Board has not eliminated the step-functions in the current model, but instead has shifted the steps to the left on the car count axis, such that significant steps now occur between one and two cars and between two and three cars, which the Board has not justified or explained, much less acknowledged.

In Part IV, Mr. Mulholland questions the Board's proposal to delineate a "unit train" at 75 cars. First, he demonstrates that the Board's reliance upon aggregated system average train sizes does not accurately represent the operating characteristics of individual Class I railroads, generating absurd results in some instances. Mr. Mulholland conducted his own analysis and concluded that the most appropriate break-point for unit trains is at 56.3 cars. Second, he questions the relevance of the Board's citation to the distribution of shipment sizes as support for a 75-car unit train definition, because frequency of service has nothing to do with type of service. In Mr. Mulholland's experience, unit trains often contain fewer than 75 cars.

In Part V, Mr. Mulholland challenges, as illogical and contrary to real world railroading, the Board's unverified assumption that Inter and Intra-Train ("I&I") switching costs decrease as shipment size increases. That assumption violates the accepted notion that I&I switching costs include both a time and an event component. While the event component would be the same for both a one car and a two-car shipment, as both shipments would move on the same trains and receive the same switching, the time component would be greater as shipment size increases; but the Board assumes it would be less. Furthermore, the Board's methodology lacks a pronounced step-down to zero I&I switching costs for unit trains which do not receive any I&I switching and thus should not be allocated any such costs.

In Part VI, Mr. Mulholland addresses the impact of the Board's proposals upon regulated rate prescriptions. He raises particular concerns with distortions that would result from the Board's proposal to apply its revised URCS variable costs only prospectively when calculating the three benchmarks in the Three-Benchmark rate case methodology. That methodology depends upon multiple years of data, some of which would be based on the current URCS costs and others on the proposed URCS costs.

In Part VII, Mr. Mulholland offers an alternative to the Board's proposed model. While he does not agree that the Board should make any changes, he offers an alternative that more accurately does what the Board purports to do in its proposal, which is to employ an approach that results in a cost curve that maintains the cost relationships currently reflected in URCS while reducing the magnitude of the step-functions where and when appropriate.

For all of the foregoing reasons, as detailed in the Verified Statement of Robert Mulholland, the Interested Parties believe that the Board's proposals in the SNPR are not sufficiently supported to warrant any change to the existing URCS model. Indeed, the step functions in the cost curve between shipment types, which the Board attempts to eliminate, often are logical and reflective of railroad operating practices. While the current make-whole adjustment is not perfect, it is based on empirical studies that sought to reasonably reflect the economies of scale inherent in the rail industry. In contrast, the Board's proposal generates illogical and unverified results. Absent compelling evidence that the existing efficiency and make-whole adjustments misallocate costs, the Board should not abandon them in favor of its untested theoretical construct. However, if the Board persists in its desire to modify the make-whole adjustment without first conducting empirical studies to validate the accuracy of its proposed changes, Mr. Mulholland has offered an alternative that at least preserves the URCS cost relationships which have been developed based upon empirical analyses.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that on this 11th day of October 2016, I served a copy of the foregoing upon all parties of record via U.S. first-class mail, postage prepaid.

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Jeffrey O. Moreno

PUBLIC VERSION

BEFORE THE
SURFACE TRANSPORTATION BOARD

Docket No. EP 431 (Sub-No. 4)	))))))	**Review of the General Purpose Costing System**

Opening
Verified Statement

Of

Robert D. Mulholland
Senior Vice President
L. E. Peabody & Associates, Inc.

On Behalf Of

The American Chemistry Council,
The Chlorine Institute, and
The Fertilizer Institute
(Collectively "the Interested Parties")

Due Date: October 11, 2016

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I. Introduction

I am Robert D. Mulholland. I am a Senior Vice President of L. E. Peabody & Associates, Inc., an economic consulting firm that specializes in solving economic, transportation, marketing, financial, accounting and fuel supply problems. I have spent most of my career of over twenty (20) years evaluating railroad markets and operations, including cost causation and allocation, pricing, financing, capacity utilization, and equipment planning issues. My assignments in these matters were commissioned by railroads, producers, shippers of different commodities, and government departments and agencies. A copy of my credentials is included as Exhibit No. 1 to this verified statement ("VS").

I have been asked by the American Chemistry Council, The Chlorine Institute, and The Fertilizer Institute (collectively "the Interested Parties") to address the proposed changes to the Uniform Railroad Costing System ("URCS") included in the Supplemental Notice of Proposed Rulemaking ("SNPR") served by the Surface Transportation Board ("STB" or "Board") in this docket on August 4, 2016. The Board describes the impetus for its proposed changes as follows:

> The objective of the Supplemental NPR is to eliminate the Make-Whole Adjustment because it produces step functions and does not appropriately reflect operating costs and economies of scale.[1]

Based on my review, I have identified several issues with the STB's proposed changes and the results of their implementation. These proposed changes are discussed below under the following topical headings:

II. Background
III. The Board's Proposed Changes Do Not Eliminate the Make-Whole Adjustment, They Just Change the Way It Is Distributed;
IV. The Board's Definition of a Unit Train Is Not Well Supported;

[1] "*Review of the General Purpose Costing System*", Presentation of Michael Boyles, Section Chief, Applied Economics & Special Studies, Office of Economics, Surface Transportation Board at the September 7, 2016 Workshop in Supplemental Notice of Proposed Rulemaking, Ex Parte 431 (Sub-No. 4), Slide 2.

V. The Board's Adjustments to I&I Switching Results in Negative Weighting for the Car Component of the Carload Weighted Block ("CWB") Formula;
VI. The Board's Proposed Implementation Plan Will Affect Rate Prescriptions.
VII. Proposed Alternate Model
VIII. Conclusion

II. Background

In railroading, certain shipments are inherently more efficient than others. Moving 100 carloads together from the same origin to the same destination in unit train service is a straightforward operation that entails relatively efficient origin and destination switching (if any is required) and requires no intermediate handling or switching. Moving 100 individual carloads from 100 different origins to 100 different destinations is a far more complicated endeavor. It entails relatively less efficient origin and destination switching and it requires local gathering operations and intermediate switching, classification, and blocking of the cars while in route.

A. The Current URCS Model

In the current URCS model, system average unit costs are developed from system total costs and system total traffic volumes in URCS Phase II. Due to the heterogeneous nature of railroad operations, very few—if any—carloads actually incur system average costs. To account for this truism, adjustments are made to individual shipment costs in URCS Phase III to reflect the relative efficiency of different shipment types. The adjustments are based on studies that were conducted to determine where changes in operations result in increases or decreases in efficiency, and therefore costs incurred.

B. Shipment Types

Based on the results of the studies, shipments are grouped into three categories: (1) Single Car ("SC") shipments contain a block of one to five carloads moving together from origin to destination; (2) Multiple Car ("MC") shipments contain a block of six to forty-nine carloads moving together from origin to destination; and (3) Unit Train ("UT") shipments contain a block of fifty or more carloads moving together from origin to destination. It is worth taking the time to consider what these designations mean in terms of the operations generally associated with each one.

1. Single Car Shipments

To take advantage of the economies of scale available in a railroad network, carriers generally strive to minimize the number of trains, and maximize the length of trains, moving over their networks.[2] This allows them to efficiently deploy their personnel (crews) and power (locomotives) and it reduces the number of train meets and passes, which results in greater efficiency and lower costs. Moving SC shipments from origin to destination using a dedicated locomotive would obviously be an inefficient and costly operation, and it would make all other operations on the railroad network less efficient and more costly as well, which would negate the economies of scale that make railroads cost effective. Therefore, moving SC shipments requires special operations. SC shipments are generally pulled from industry tracks by a switch locomotive or local train and moved to a yard where they are classified and blocked with other carloads that will move from that yard in the same direction over the network in a manifest train. The route of the manifest train is driven by the overall flow of traffic moving over the system, not by the optimal routing for any individual SC shipment that may be moving on the train. As a result, SC shipments must be switched from train to train, and may take a circuitous route from their origin to their destination. They are generally placed at their destination in the same way they are pulled from their origin—by a local train or a switch locomotive.

2. Multiple Car Shipments

Moving MC shipments from origin to destination using a dedicated locomotive would also be a relatively inefficient and costly operation, although not as inefficient as for an SC shipment. Therefore, MC shipments also require special operations. Like SC shipments, MC

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[2] Although generally true, this concept is somewhat oversimplified for purposes of making this point. There is a point at which trains become too long to be practical to move over the rail networks, and there are operational realities—such as shipper service requirements—that necessitate the movement of shorter than optimal trains over the networks.

shipments are often pulled from industry tracks by a switch locomotive or local train and moved to a yard where they are classified and blocked with other carloads that will move from that yard in the same direction over the network in a manifest train. However, unlike for SC shipments, the local train or switch locomotive may be dedicated to this service, whereas for SC shipments, the local gathering train may serve multiple industries before returning to the yard. This results in somewhat more efficient "first mile" operations for MC shipments compared to SC shipments. As discussed above, the routes of manifest trains are driven by the overall flow of traffic moving over a railroad system, not by the optimal routing for any individual shipment that may be moving on the train.

3. Unit Train Shipments

Moving UT shipments from origin to destination does entail the use of dedicated locomotives. These are the most efficient operations on the rail network. Unlike SC and MC shipments, UT shipments are generally pulled from industry tracks by the road locomotives that move them from origin to destination. UT shipments do not move through a classification yard. The routes of unit trains are driven entirely by the optimal routing for the individual shipment moving on that train. UT shipments are handled only at origin and destination, and their routes are generally not circuitous.

C. URCS Phase III Adjustments

The adjustments made in URCS Phase III are meant to reflect the relative efficiencies of the various shipment types while accounting for the total costs for the studied carrier during the movement year. They generally reflect that UT shipments are more efficient and less costly than an average shipment (on a per-car basis), SC shipments are less efficient and more costly than an average shipment (on a per-car basis), and MC shipments are more efficient in some regards and less efficient in some regards than an average shipment (on a per-car basis).

1. Industry Switching

An efficiency adjustment is made to the per-car industry switching unit costs in URCS Phase III for UT (75% reduction) and MC (50% reduction) shipments. These are meant to reflect the relative efficiency of using dedicated locomotives to pull MC/UT shipments from, and place MC/UT shipments into, industry sidings or loop tracks, compared to the system average. The total reduction in industry switching costs after the per-car efficiency adjustment is applied to MC and UT shipments is then applied to the carloads moving in SC service. This "make-whole adjustment" is meant to reflect the relative inefficiency of pulling very small cuts of cars from, and placing them into, industry sidings (compared to the system average.) By reallocating the assumed cost savings from the efficient MC and UT industry switching operations to the inefficient SC industry switching operations, the railroad is made whole in terms of its total system industry switching costs. After the URCS Phase III adjustments are applied, SC shipments are restated to reflect higher than system average industry switching cost on a per-unit basis than a system average carload, while MC and UT shipments are restated to reflect lower than system average cost on a per-unit basis than a system average carload.

2. Interchange Switching

In URCS Phase III, for switching of cars received in interchange from another railroad (interchange switching,) an efficiency adjustment is made to the per-car switching unit costs for UT shipments only (50% reduction.) This is meant to reflect the relative efficiency of unit train interline operations, which only require changing crews and sometimes locomotives. The total reduction in interchange switching costs after the per-car efficiency adjustment is applied to UT shipments is then applied to the SC and MC shipments as the make-whole adjustment. This is meant to reflect the relative inefficiency of receiving/forwarding less-than-trainload shipments from/to a foreign road, which requires classification and blocking of the received/forwarded shipments. This make-whole adjustment reallocates the cost savings from the efficient UT interchange switching operations to the less efficient SC and MC shipments' interchange switching operations. After the URCS Phase III adjustments are applied, SC and MC shipments are shown to be more costly to handle on a per-unit basis than a system average carload, while UT shipments are shown to be less costly to handle on a per-unit basis than a system average carload.

3. I&I Switching

Repositioning cars on a train (**Intra**-train switching) or switching cars from one train to another (**Inter**-train switching) on a railroad's network is collectively known as "I&I switching." This type of switching occurs on non-unit train shipments that must be handled between origin and destination. Because no I&I switching is required on UT shipments, no I&I switching unit costs are included in URCS Phase III for UT shipments. The total reduction in I&I switching costs after the per-car efficiency adjustment is applied to UT shipments is then applied to the SC and MC carloads. This is meant to reflect the extra handling required to move non-unit train shipments from origin to destination. After the URCS Phase III adjustments are applied, SC and MC shipments are shown to be more costly to handle on a per-unit basis than the system average, while UT shipments are shown to incur no I&I switching costs.

4. Inter-terminal and Intra-terminal Switching

The movement of carloads between (Inter) or within (Intra) terminals is referred to as Inter-terminal and Intra-terminal switching. An efficiency adjustment is made to the per-car industry switching unit costs for UT (87.5% reduction) and MC (50% reduction) shipments. These are meant to reflect the relative efficiency of moving MC and UT shipments together as blocks in terminal areas compared to the system average. The total reduction in switching costs after the per-car efficiency adjustment applied to MC and UT shipments is then applied as a make-whole adjustment to the carloads moving in SC service. This is meant to reflect the relative inefficiency of moving very small cuts of cars in the terminal area. After the URCS Phase III adjustments are applied, SC shipments are shown to have more costly terminal handling characteristics on a per-unit basis than a system average carload, while MC and UT shipments are shown to have less costly terminal handling characteristics on a per-unit basis than a system average carload.

5. Station Clerical

The movement of railcars results in carriers incurring administrative costs which URCS Phase III allocates to shipments on a per-unit basis as station clerical costs. Because carloads moving in MC and UT shipments are billed and processed as a single cut, they generate lower administrative costs than SC shipments billed and processed separately. Therefore, an efficiency adjustment is made in URCS Phase III to the per-car station clerical unit costs for MC and UT shipments. The efficiency adjustment reduction is based on a function in which 75% of the costs are considered to be related to the number of carloads in the shipment and 25% of the costs are considered to be related to the shipment. This results in a station clerical unit cost reduction of 20.83% for a six car MC shipment, increasing to a theoretical 25% reduction for an infinity car UT shipment. The total reduction in station clerical costs after the per-car efficiency adjustments are applied to MC and UT shipments is then applied to the SC carloads as a make-whole adjustment. After the URCS Phase III adjustments are applied, SC shipments are shown to be more costly to process on a per-unit basis than a system average carload, while MC and UT shipments are shown to be less costly to process on a per-unit basis than a system average carload.

III. The Board's Proposed Changes Do Not Eliminate the Make-Whole Adjustment, They Just Change the Way It Is Distributed

The Board notes that the combination of the make-whole adjustment and the efficiency adjustment—as currently applied in URCS Phase III—creates cost step functions between the shipment types when evaluated on a per-car basis. The Board acknowledges that the step functions reflect economies of scale between the three shipment types, as described in Section II above. The Board expresses concern, however, that the current URCS Phase III model does not reflect economies of scale within the shipment type groups (e.g., the unit cost for an SC shipment is the same whether it is a one-car or a five-car shipment,) and that the hard break points between shipment types "may not reflect true efficiency differences between single-car and multi-car shipments, and between multi-car and unit train shipments"[3] (e.g., the unit cost for a five-car shipment is significantly greater that the unit cost for a six-car shipment in the current URCS Phase III model.) Figure 1 below[4] shows the current and proposed cost function for Industry and I&I switching.

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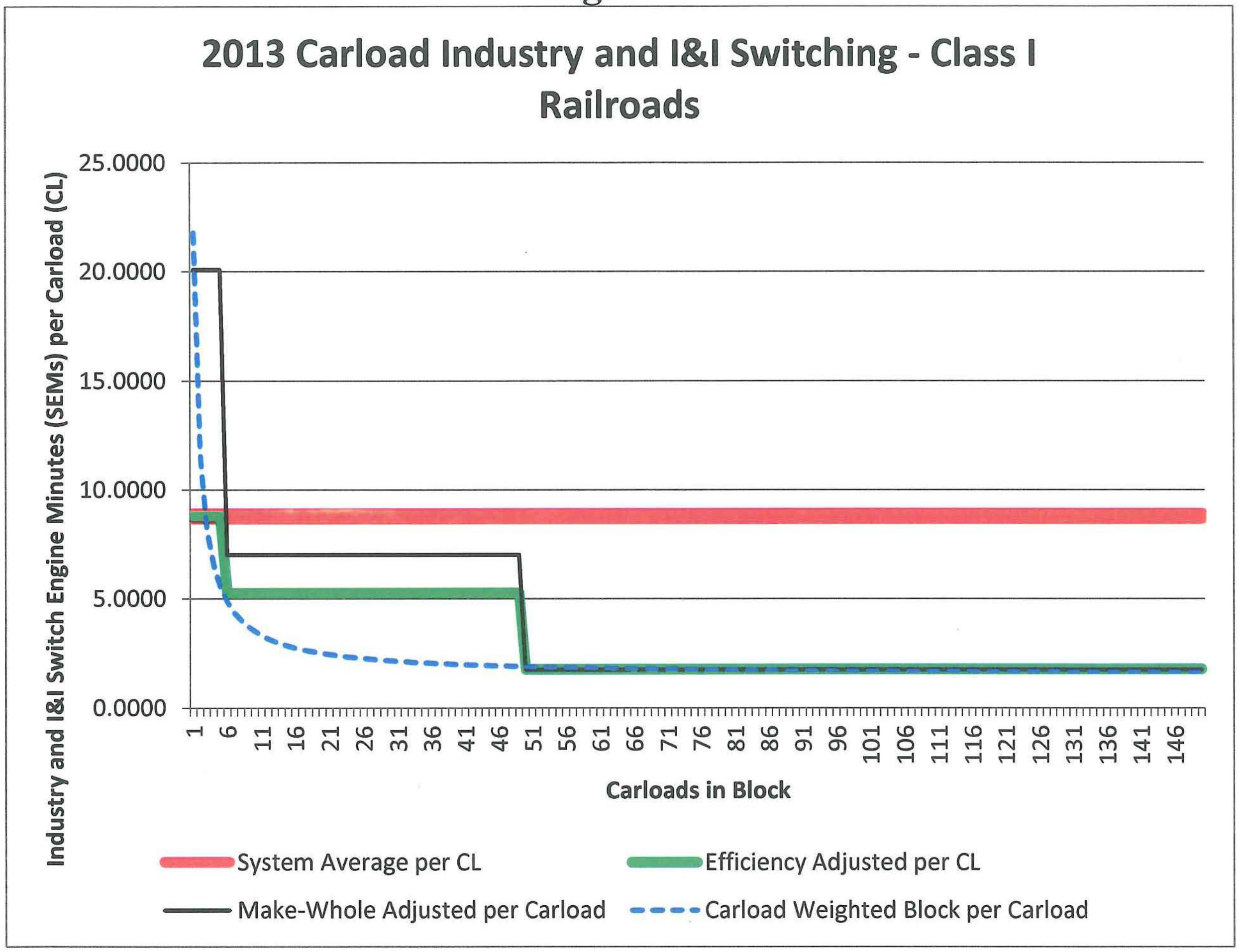
[3] *SNPR* at 4.
[4] STB workpaper "EP431S4_SEMs_IndustryAndI&I.xlsx" at tab "Chart 3".

Figure 1



The Board's conviction that there is a problem with the current model appears to be driven largely by the break points in URCS Phase III costs between the groups (shown as the black vertical lines in Figure 1 above.) The Board's proposed model seeks to smooth out the break points.

> [T]he Supplemental NPR would adjust how Phase III allocates SEMs to account for economies of scale and recognize the fact that switching costs include both a time component and an event component. Under the revised proposal, Phase III would adjust the system-average unit costs by incorporating both the time component of switching (carload basis) and the event component of switching (shipment basis). In this way, the efficiency adjustments that are reflected in Phase III would no longer result in a step function and would reflect economies of scale for every different shipment size.[5]

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5 *SNPR* at 8.

To achieve its stated objective, the Board created a new formula to allocate costs to individual shipments in URCS Phase III.

> [T]he Board would employ a new concept called the Carload Weighted Block (CWB) Adjustment. The CWB Adjustment applies a weighting to a block of cars based on a percentage of the number of cars in that block. The CWB value is calculated as the number of cars in a block multiplied by the percentage by which switching varies by carload, plus the number of blocks multiplied by the percentage by which switching varies by block—thus reflecting the fact that switching costs are dependent in part on the number of cars in a block, due to the time and event components of switching.[6]

Heeding the call of several commenters from the 2013 proceeding, the Board's proposed model is ostensibly designed to maintain the cost relationships reflected in the current efficiency adjustments in URCS Phase III, which the Board recognizes were developed using empirical data. The Board claims to have done this "by maintaining the percentage reduction for unit train traffic currently embodied in the Phase III efficiency adjustments."[7]

> For example, for industry switching, URCS currently applies a 75% reduction in assigned SEMs for unit train traffic, and a 50% reduction in assigned SEMs for multi-car traffic, by way of a step function. The proposal would continue applying the 75% reduction for unit train traffic, but would now achieve this reduction by way of an asymptotic curve. The efficiency reductions for single-car and multi-car traffic would no longer apply; rather, the efficiencies associated with such movements would be allocated through the asymptotic curve.[8]

The Board's description of its proposed formula contains technical inaccuracies. The curve developed by the Board is not asymptotic. An asymptotic curve approaches but does not intersect a line as the curve and the line tend to infinity. If the Board's curve were in fact asymptotic, the efficiency adjustment for UT traffic would approach but never equal the current efficiency adjustment (a 75 percent unit cost reduction). However, the Board's formula is

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[6] *Id* at 9, footnote omitted.
[7] *Id* at 8-9
[8] *Id* at 9.

calibrated such that a 75-car shipment receives the extant 75% reduction, and the Board's curve is negatively sloped (i.e., the proposed efficiency adjustment actually exceeds the 75% reduction currently applied for all shipments greater than 75 cars.) Therefore, despite its claim, the Board's proposed model does not "continue applying the 75% reduction for unit train traffic," except for 75-car shipments. For all other shipment sizes (above and below 75-car shipments,) the existing URCS cost relationship is discarded.

Moreover, as shown in Figure 1 above, the cost relationship for MC shipments in the current model are completely discarded by the proposed model. Specifically, switching costs for most shipments of six to 49 carloads are more than cut in half, and the (dashed blue) cost curve more closely reflects unit train efficiencies than carload traffic efficiencies as determined using the current formula (solid black line.)

For SC shipments, The Board's proposed CWB model departs completely from the current model. The current model shows all SC carloads cost more to switch than the system average on a per-unit basis (solid black line,) whereas the Board's proposed model shows most SC shipments cost less than the system average on a per unit basis (dashed blue curve.) As discussed in more detail in Section III.A.3. and Section VII below, the Board's proposed model irrationally assumes that only one- and two-car shipments cost more than the system average to switch.

A. The Carload Weighted Block ("CWB") Model

Although it is somewhat stylish in design, the Board's model produces questionable results.

> [T]o convert system average SEMs from Phase II to SEMs in Phase III that reflect economies of scale, the Supplemental NPR proposes the following calculation, where the CWB Ratio represents SEMs per CWB divided by SEMs per carload:

*Phase III Adjusted SEMs = (Phase II System Average SEMs) * (CWB Ratio) * (CWB)*[9]

The STB claims that its proposed CWB adjustment is "more appropriate than the current make-whole adjustment" for several reasons. Specifically, the Board claims that the CWB model:

- "[R]eflect[s] increasing economies of scale as shipment size increases;"
- "[Does] not produc[e] a step function;"
- "[Does] not require[e] an add-back of the shortfall;" and
- "[B]etter reflects the cost causality principle from the RAPB's Final Report because of the changing economies of scale for every different shipment size."[10]

Each of the Boards claims is addressed below.

1. Economies of Scale

Under CWB, nearly all of the costing weight for industry switching is placed on the shipment (over 90 percent), and very little is placed on the carloads that make up the shipment (less than 10 percent).[11] The carload percentage is constant regardless of the shipment size. Therefore, applying the Board's proposed changes does not reflect increasing economies of scale as shipment size increases when measured by incremental cost. Tables 1 and 2 below contain data from the Board's workpapers that demonstrate this point.

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[9] *Id.*
[10] *Id* at 10.
[11] STB workpaper "EP431S4_SEMs.xlsx" at tab "Results" range C9:D9.

Table 1
Carload Weighted Block Total Industry SEM[12]

Cars in Block (1)	Carload Weighted Block Total SEM (2)	Incremental Difference (3)
1	17.7042	xxx
2	19.2435	1.5393
...		
149	245.5188	xxx
150	247.0580	1.5393

As shown in Table 1 above, total industry switching SEM under the CWB model is 17.7042 for a one-car shipment and 19.2435 for a two-car shipment, an incremental difference of 1.5393 SEM. Total industry switching SEM under the CWB model is 245.5188 for a 149-car shipment and 247.0580 for a 150-car shipment, an incremental difference of 1.5393 SEM. Therefore, under CWB, adding one car to any shipment size results in an addition of 1.5393 SEM.

[12] STB workpaper "EP431S4_SEMs_IndustryAndI&I.xlsx" at tab "Indusrty_Carload_Table" cells J12, J13, J160 and J161 respectively.

Table 2
Make-Whole Adjusted Total Industry SEM[13]

Cars in Block (1)	Make-Whole Adjusted Total SEM (2)	Incremental Difference (3)
1	16.5965	xxx
2	33.1930	16.5965
. . .		
149	261.4681	xxx
150	263.2229	1.7548

As shown in Table 2 above, total industry switching SEM under the current URCS Phase III model is 16.5965 for a one-car shipment and 33.1930 for a two-car shipment, an incremental difference of 16.5965 SEM. Total industry switching SEM under the CWB model is 261.4681 for a 149-car shipment and 263.2229 for a 150-car shipment, an incremental difference of 1.7548 SEM. Therefore, under the current model, adding one car to a small shipment logically results in the addition of significantly more SEM than adding one car to a large shipment. The extent to which the current differential is correct is a fair question, but the fact that there is a differential makes the current model theoretically sounder than the proposed model.

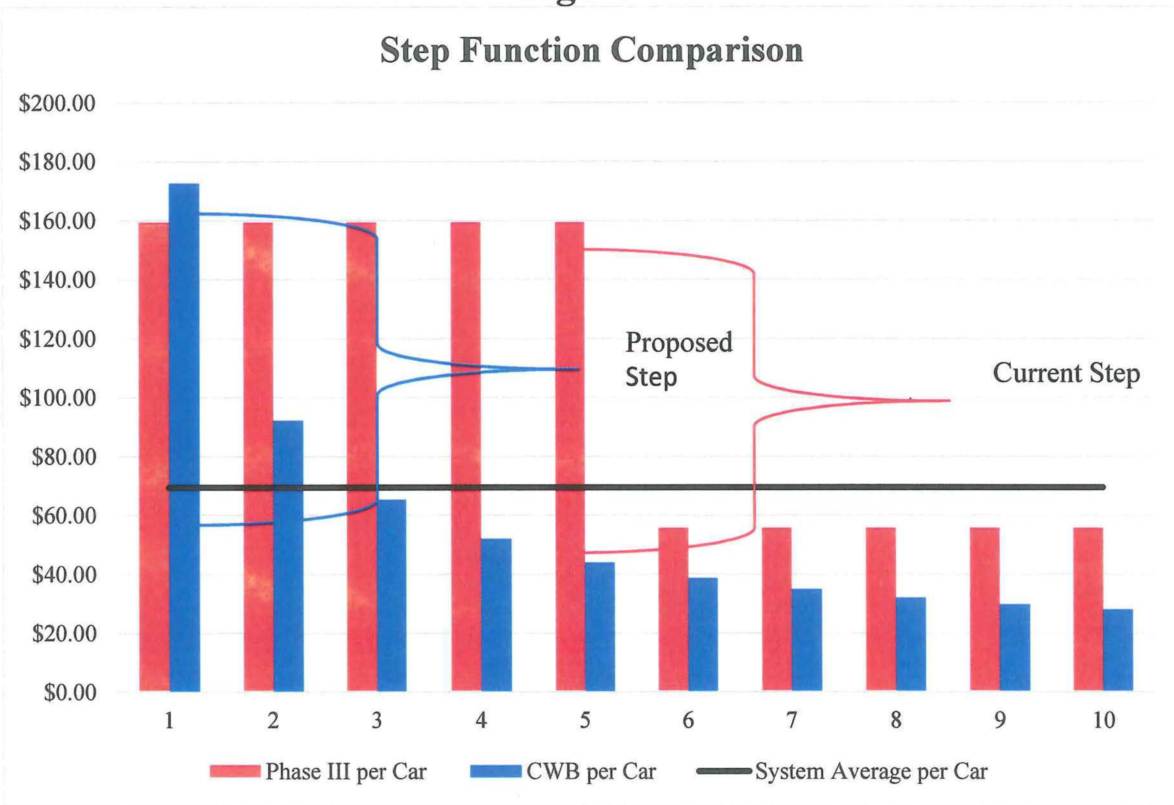
2. Step Function

Figure 1 above purports to show that the Board's proposed calculations eliminate the steps in the current model. However, the level of aggregation is somewhat deceptive. Specifically, although the unit cost declines as cars are added to a shipment at all points along the curve, the slope of the curve is near vertical at the x-axis and flattens to near horizontal beyond 10 carloads. It is essentially a kinked line. In fact, when just the portion of the curve between

[13] STB workpaper "EP431S4_SEMs_IndustryAndI&I.xlsx" at tab "Indusrty_Carload_Table" cells I12, I13, I160 and I161 respectively.

one and ten carloads is evaluated, it is clear that the Board's model merely moves the steps left compared to the current model, as shown in Figure 2 below.[14]

Figure 2



As shown in Figure 2 above, there are significant steps between one and two cars and between two and three cars under the proposed model, whereas there is a significant step between five and six cars in the current model. Thus the Board's claim that its model eliminates step functions is dubious.

Exhibit No. 2 to this VS contains a comparison of the application of both the current model and the Board's proposed CWB model to shipments of one to ten cars on BNSF, CSXT, NS, and UP. As shown in Exhibit No. 2, in the current model, BNSF variable costs per ton for a sample 500-mile chlorine shipment are identical for one-car and two-car car shipments, but

[14] Workpaper "EP431S4_SEMs_IndustryAndI&I LEPA1.xlsx" at tab "IndustryAndI&I_Carload_Table" range S4:AC22.

decrease 27.2 percent between a five-car and a six-car shipment. In the STB's proposed CWB model, BNSF variable costs per ton decrease 22.2 percent between a one-car and a two-car shipment, but only decreases 2.3 percent between a five-car and a six-car shipment. The cost step between one and two car shipments under the Board's proposed model is significant.

Furthermore, as discussed in Section VII below, step functions in the cost curve are logical in many cases, and the Board's overarching desire to eliminate all step functions between shipment types is misguided and ignores the realities of real world railroading.

3. Shortfall Add-Back

Despite the Board's claims, its new model implicitly creates a shortfall and adds it back to select shipments as does the current model. It is just accomplished in a different manner and the add back is distributed in a more concentrated manner. This is depicted in Figure 2 above. As shown, application of the Board's proposed model results in less than system average costs for three-car through five-car shipments. In other words, the Board's proposed model retains—and even increases—the make-whole adjustment for some SC shipments, while it eliminates the make-whole adjustment and actually applies an efficiency adjustment to many SC shipments. The Board cannot claim is has "maintain[ed] the existing cost relationships in URCS."[15]

4. Cost Causality Principle

As discussed above, the Board's proposed model creates substantial steps within the SC shipment type, which is contrary to its stated objective to eliminate step functions. More concerning, however, is that the Board's model essentially obliterates the shipment type groupings altogether. It is designed to smooth out the cost function such that there are no hard break points at the borders between SC, MC, and UT shipments. In practice, there are no longer three shipment types in URCS under the Board's model. Although there is a nominal break

[15] *SNPR* at 9.

between UT and carload (SC and MC) traffic, the nature of the Board's algorithm results in that being a distinction without a difference. The break is merely used to calibrate the point at which the efficiency adjustment under the proposed model matches the efficiency adjustment under the current model.[16]

Because the carload and shipment percentages are constant for all shipment sizes, the Board's model actually replaces the three shipment types with a single continuum. A 75-car unit train incurs 25 percent of the system average SEM per industry switch event, a 76-car unit train incurs just under 25 percent of the system average SEM per industry switch event, and a 74-car unit train incurs just over 25 percent of the system average SEM per industry switch event. The Board's definition of a unit train is meaningless with respect to defining how a shipment is handled.[17] As discussed in Section V below, it is meaningful only in calibrating the CWB weights.

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[16] At all points to the right of this point (i.e., unit trains greater than 75 cars in length,) the efficiency adjustment is greater on a per-unit basis that it is in the current model.

[17] In addition, the Board proposes to eliminate the use of an E/L Ratio of 2.0 for unit trains, so that empty return routing will be assumed to be the same for carload and unit trains. *SNPR* at 18-20.

IV. The Board's Definition of a Unit Train Is Not Well Supported

The Board is proposing to change the number of cars in unit train movements to 75 or more, stating that "the Supplemental NPR proposes to change the definition to better reflect current railroad operations so that efficiencies in URCS better reflect the principle of cost causation as articulated in the RAPB, regardless of which traffic group may or may not be affected."[18]

As a practical matter, the Board's selection of 75 cars as the point at which a shipment moves in unit train service matters only as it relates to calibrating the CWB formula, because the Board's proposed model essentially eliminates the distinction between carload and unit train operations, as discussed in Section III above. However, it is still worth discussing the Board's rationale and the methodology it used to select 75 as the break point between carload and unit train traffic. Below, I separately discuss the Board's break point selection and its impact.

A. The 75-Car Minimum Unit Train Size

The Board's selection of 75 cars as the proposed point at which a shipment must be assumed to move in unit train service is based on two questionable analyses. Each is discussed below.

1. Aggregated Weighted Average Cars Per Train

The Board first developed a weighted average train size from the railroads' R-1 reports. The calculated weighted average includes through and unit train data but excludes way train

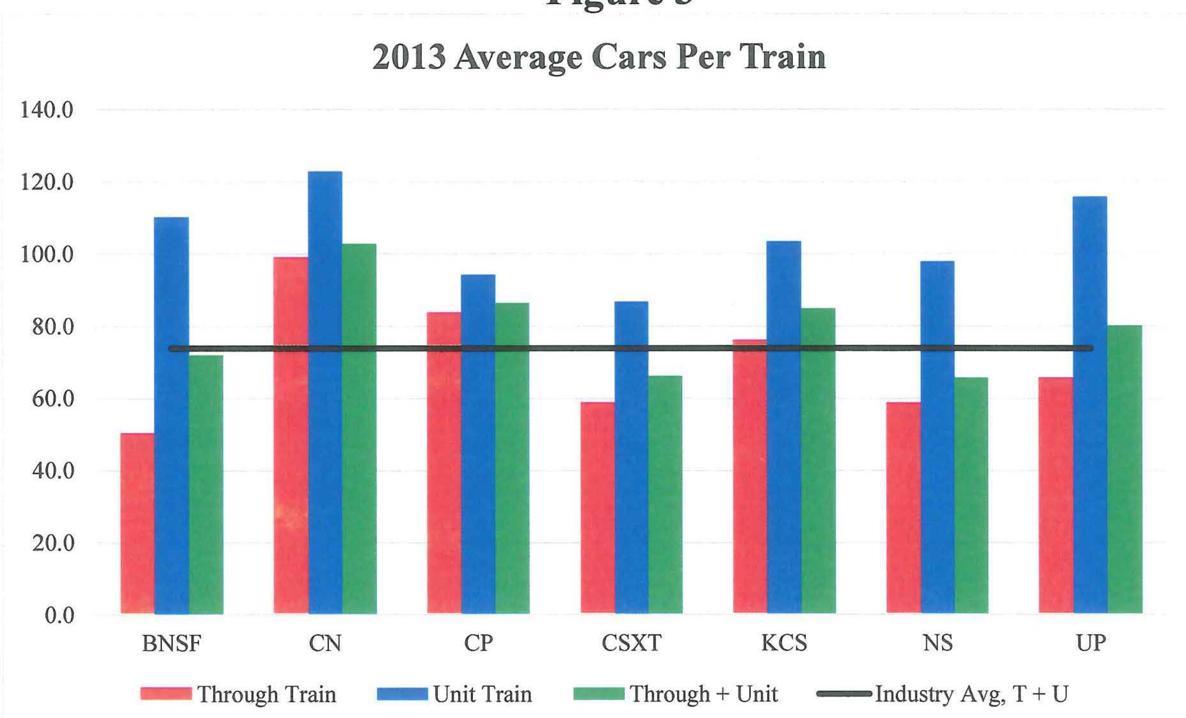
[18] *SNPR* at 23, footnotes omitted.

data. The Board then assumes that this weighted average "determine[s] the break point between these two train lengths and, accordingly, determine[s] the lower-end size of unit train service."[19]

Using aggregated through train and unit train R-1 data for the Class I carriers, the Board's calculations result in industry weighted averages of 78.2 cars in 2011, 77.5 cars in 2012, and 73.9 cars in 2013.[20] The Board declares that these aggregated weighted average train lengths represent the demarcation point between a unit train and a through train and "support the Board's proposed definition of 75 cars."[21]

Examination of the Board's workpapers reveals a much more nuanced reality, as shown in Figure 3 below.[22]

Figure 3



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[19] *SNPR* at 25, citing STB workpaper "EP431S4_Unit Train Definition.xlsx".

[20] The Board's 2011 calculation includes only BNSF, CSXT, NS, and UP, whereas the Board's 2012 and 2013 calculations include all seven Class I railroads.

[21] *SNPR* at 25.

[22] Workpaper "EP431S4_Unit Train Definition LEPA.xlsx" at tab "2013" range C32:H50.

As Figure 3 shows, the aggregated system average does not accurately represent the operating characteristics of the individual railroads. For example, in 2013, through trains moving on CN and CP (red bars) contained far more cars than the aggregated system average train size (black line). If the Board's methodology were applied to the railroads individually, the break point for CN would have been 103 cars in 2013. Applying the Board's model and logic to CN alone would result in the absurd assumption that 100-car shipments would not move in unit train service on the CN system.

The flaw in the Board's logic is best demonstrated by evaluating BNSF's 2013 system average statistics. According to the Board's workpapers, BNSF's system average train size was 72.1 cars, which was close to the industry-wide system average of 73.9 cars. However, BNSF's system average through train size was 50.3 cars. A 60-car shipment on BNSF's system would contain roughly 20 percent more cars than the average BNSF through train. As through trains comprise many SC and MC shipments, the Board's model would force the assumption that the 60-car shipment on BNSF would need to be combined with other shipments totaling 15 cars before it would be moved (i.e., BNSF would not move the 60-car shipment as a unit train.) This assumption would result in a hypothetical through train that contained roughly 50 percent more cars than the actual system average through train moving on BNSF's system.

The resulting costing exercise clearly would not reflect BNSF's actual operations. It would be far more logical to assume that any shipment containing more cars than the system average <u>through train</u> would move as a unit train than to assume, as the Board has, that any shipment containing more cars than the aggregated system average train would move as a unit train. In 2013, the aggregated industry-wide weighted average through train contained 60.2 cars per train.

Even this approach would overstate the minimum unit train size. The only train category the Board excluded from its analysis—way trains—is actually quite relevant to the analysis. As the Board recognized, 'The R-1 Schedule 755 Instructions define 'way train' as 'trains operated primarily to gather and distribute cars in road service and move them between way stations or way points.'"[23] Shipments that are originated or terminated by way trains are carload (SC and MC) shipments. Therefore, way train statistics are particularly relevant to determining the size of SC and MC shipments. The Board should have tried to determine the largest MC shipment, and then assume all shipments larger than that move in UT service, rather than trying to guess at the minimum unit train size.

The industry-wide weighted average way train contained only 25.4 cars in 2013. Because this is an average, the way train group obviously includes some trains of more than 25.4 cars, which implies that some MC shipments are greater than 25.4 cars in length. Using the Board's workpapers, I developed an industry-wide weighted average of way and through trains in 2013. The result was 56.3 cars. As discussed in more detail in Section VII below, I presumed this represents the maximum shipment size for carload (SC and MC) traffic. Shipments above this level should continue to be assumed to move in UT service.

2. Train Size Distribution

The Board also cites the distribution of shipment sizes in an attempt to buttress its selection of 75 cars as the break point between carload and unit train service. Specifically, because "there is a high occurrence of 75-car movements compared to other shipment sizes

[23] *SNPR* at 24, footnote 63.

between 50 cars and 90 cars according to 2012 and 2013 data… the Board finds that it is more appropriate to define unit train service as 75 cars or more."[24]

The fact that there are significantly more 75-car shipments than 74-car shipments has no bearing on how the 74-car shipments were moved by the railroads. Frequency of service has nothing to do with type of service. There are also significantly more 135-car shipments than 134-car shipments, but everyone would rightly assume that the 134-car shipments move in unit train service, as do 135-car shipments.

Furthermore, the Board ignored other spikes at 50, 60, 65, and 72 cars. The Board did not investigate what these shipments were. Rather, it stated that it "does not believe it is necessary… when there are other means of accounting for these impacts."[25] Based on my experience, I can say for certain that shipments of fewer than 75 cars often move in unit train service, including shipments of the Interested Parties.

3. The Impact of the Chosen Minimum Unit Train Size

Due to the fact that the Board's proposed adjustments are designed to eliminate all steps in the URCS cost functions, there would be very little practical difference between the largest carload (SC and MC) shipment and the smallest UT shipment if the proposed model is adopted. However, the Board's 75-car cutoff point is important because the Board's model is calibrated to solve for the case where that particular shipment size achieves the efficiency adjustments from the current model (e.g., 25% of system average industry switching costs and zero I&I switching costs). The costs for all other shipments are dependent on this equation. This UT demarcation point determines the shape and slope of the CWB curve. I changed the Board's model to solve

[24] *SNPR* at 25, citing Appendix F and STB workpapers "Frequency of Shipment Sizes_2012.xlsx" and "Frequency of Shipment Sizes_2013.xlsx."

[25] *SNPR* at 3.

for these values at 50, 75, 100, and 150 carloads and assessed its impact on a one-car shipment. The results are shown in Table 3 below.

Table 3
One-Car Shipment CWB Variable Costs[26]

	Unit Train Definition At			
Railroad (1)	50 Cars (2)	75 Cars (3)	100 Cars (4)	150 Cars (5)
BNSF	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
UP	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
NS	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
CSXT	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}

As Table 3 shows, changing the definition of a unit train shipment in the Board's model impacts the variable costs per carload for one-car shipments.[27] Increases in assumed minimum unit train length would reduce the variable costs for single car shipments.

As discussed above in Section III, the Board's model does not actually employ an asymptotic curve in developing its industry and interchange switching cost weights that are used as variables in the CWB formula. That is, the system average costs for shipments of more than 75 cars are reduced by more than the current efficiency adjustments (75% for industry switching and 50% for interchange switching.) The larger the shipment size solved for using the Board's model, the closer one gets to an asymptotic curve. However, increasing the target shipment size would result in unit train shipments of fewer than that cutoff number being reduced by less than the current efficiency adjustments (75% for industry switching and 50% for interchange switching.) Additionally, increasing the target shipment size would result in unit train shipments

[26] Workpaper "EP 431 2016_Impact of UT Definition on Single Car.xlsx" at tab "Table for VS".
[27] In fact, it changes the variable costs for all shipment sizes.

of fewer than the chosen cutoff number being allocated a small amount of I&I switching costs between origin and destination, which the railroad would not actually incur.

V. The Board's Adjustments to I&I Switching Results in Negative Weighting for the Car Component of the CWB Formula

I&I switching costs are allocated to carload shipments based on an assumption regarding the frequency at which they are handled while en route. More specifically, the URCS model assumes all shipments receive I&I switching at a fixed mileage interval. In the current model, the assumption is that SC and MC shipments undergo I&I switching every 200 miles. The 200-mile assumption is used to develop system average SEM in URCS Phase II, and those SEMs are applied in URCS Phase III to develop movement variable costs.

The Board proposes to increase the assumed miles between I&I switching events from 200 miles to 268 miles. This adjustment is based on the Board's evaluation of the increase in overall shipment length between 1990 and 2011. In the intervening years, the industry has seen several consolidations, such that there are now far fewer, far larger railroad networks than there were in 1990. There are undoubtedly fewer interchange switch events now because there are fewer interchange points. However, the assumption that I&I switching occurs at greater intervals may or may not be accurate. It is dictated by the location of major classification yards, which have changed somewhat. However, the link between overall shipment miles and I&I switching locations has not been established. The Board believes a study to make that link would be too costly to perform.[28]

Regardless of whether the Board's proposed increase more accurately reflects current railroad operations, its proposed cost model only uses the mileage to develop system average SEM in URCS Phase II. The Board's model explicitly discards its proposed updated mileage interval in developing I&I costs for individual shipments. As the Board acknowledges, its model

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[28] *SNPR* at 11.

"results in decreasing total I&I switching costs as shipment size increases. In other words, the total I&I costs for a two-car shipment would be slightly less than for a one-car shipment."[29]

This result is illogical and does not reflect real world railroading. In fact, it violates the notion that "switching costs include both a time and an event component."[30] It is well established that switching two cars is more costly than switching one.

> As theoretical matter, costs are generally incurred on both an event basis and on a time basis. For example, there are certain costs that are incurred every time a block of cars are switched. But there are also costs that increase as the length of time necessary to accomplish those switches increase. Switching a block of 40 cars will result in higher costs than switching a block of two cars.[31]

There is no practical difference between the way a one-car shipment is handled between origin and destination and the way a two-car shipment is handled between the same origin and destination. Both shipments would move on the same trains and receive the same switching. The event component would be the same. However, it would take longer and cost more to switch the two-car shipment. The total time component would be greater for the larger shipment.

Many shippers, including the Interested Parties, move one- or two-car cuts as required between the same origin-destination pairs. These shipments move on the same trains and are interchanged at the same locations regardless whether they are one or two cars. Because it is irrefutable that per-event I&I switching costs for a two-car shipment would be greater than per-event I&I switching costs for a one-car shipment, there is only one explanation for the Board's proposed negative car weight. The Board's model presumes that a two-car shipment receives fewer I&I switches than a one-car shipment between origin and destination. The corollary is that the mileage between I&I switches goes up as cars are added. The Board made no attempt to

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29 *Id*, at 10.
30 *Id*, at 8.
31 AAR June 20, 2013 Opening Comments in *Ex Parte 431 (Sub-No. 4)*, p. 25.

verify this assumption. The STB's presumption that two-car shipments are handled less frequently than one-car shipments is incorrect.

The Board's model applies a back-door adjustment to the mileage between I&I switches for all shipment sizes from one to 74 cars via its negative weight for the car component of the CWB formula for this type of switching. This negative weight should be a red flag to the Board. It necessarily means that the Board's restated 268-miles between I&I switches for carload traffic used to generate the URCS Phase II SEM per event are not applied to all carloads evenly in URCS Phase III. In fact, the 268 mile bogey is not applied to any shipment size in the proposed model. Table 4 below shows the miles between I&I switches implicit in the application of the Board's proposed model.

Table 4
Miles Implicit in CWB I&I Formula[32]

Cars in Block (1)	CWB Implicit Miles Between I&I Switching BNSF (2)	UP (3)	CSXT (4)	NS (5)
1	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
2	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
3	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
4	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
5	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
6	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
7	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
8	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
9	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
10	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
20	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
30	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
40	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
50	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
60	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}
70	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}	{{[redacted]}}

As shown in Table 4 above, the Board's proposed model does not apply its assumed 268 miles between I&I switch events to any shipment. For BNSF, the bogey of 268 miles falls somewhere between the proposed calculation for {{[redacted]}} shipments; for UP it falls between{{[redacted]}} shipments; and for CSXT and NS it falls between {{[redacted]}} shipments.

Moreover, the miles between I&I switch events rapidly climbs to the point at which they exceed the system average movement miles, and even vastly exceed the system average route miles for the various railroads. A step function in the I&I switching cost curve is not only logical, it is necessary. I&I switching is an operation that is simply not performed on any unit

32 Workpaper "Summary of EP431_CWB Implicit Miles.xlsx" at tab "Table for VS".

train shipments, while it is—by definition—performed on every non-unit train shipment. Therefore, any cost curve that does not have a pronounced step down to zero for unit trains is not credible.

VI. The Board's Proposed Implementation Plan Will Affect Rate Prescriptions.

The Board's proposed changes will affect rate prescriptions in two ways. First, they will result in different variable cost determinations for every shipment on the railroads, affecting both the rates of regulated shipments and even the Board's jurisdiction over some rates altogether. Second, they will change the variable cost determinations that are used to develop benchmarks in the models used to determine maximum reasonable rates.

A. The Board's Proposed Changes Result in Increased Costs for One-Car Shipments

The Board's proposed methodology increases terminal switching, interchange switching, I&I switching, inter-terminal and intra-terminal switching, and station clerical costs for one-car shipments while it significantly decreases those costs for shipments of two through five cars. The increase in I&I switching costs for one-car shipments occurs despite an increase in the assumed miles between I&I switch events. This result does not remedy—in fact it exacerbates—a problem the Board first identified six years ago.

The STB submitted a report to Congress on URCS dated May 27, 2010 in which the Board discussed the make-whole adjustment.[33] In that discussion, the STB expressed concern that, as railroads convert more and more traffic to longer trains, there are ever fewer single car and multiple car shipments left to absorb the shortfall that is reallocated by the make-whole factor. The STB suggested that a study might reveal that the current make-whole adjustment and modern shipment practices may be resulting in an upward distortion of single-car variable costs. The Board failed to acknowledge this issue in the SNPR.

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[33] Surface Transportation Board Report to Congress Regarding the Uniform Rail Costing System, May 27, 2010, pp. 18-19.

As shown in Table 5 below, the Board's new proposals actually create an even greater upward adjustment in single-car variable costs—exacerbating the very problem it opined should be addressed in 2010.

Table 5
2013 BNSF URCS Variable Costs for Example One-Car Shipment[34]
(STCC 281, Tank Car <22,000 Gal, 500 Loaded Miles, 90 Tons Per Car, Originated-Terminated, Private)

Item	Source	Current URCS	Proposed URCS 1/	Difference
(1)	(2)	(3)	(4)	(5)
1. LUM Costs	URCS L607-609	{{[redacted]}}	{{[redacted]}}	$0.00
2. O/T Clerical Costs	URCS L611	{{[redacted]}}	{{[redacted]}}	$8.61
3. Train-Mile Costs	URCS L617-622	{{[redacted]}}	{{[redacted]}}	$0.00
4. SEM Costs	URCS L623-631	{{[redacted]}}	{{[redacted]}}	$674.40
5. Make-Whole Adjustment	URCS L587	{{[redacted]}}	{{[redacted]}}	-$543.62
6. Other Costs	xxx	{{[redacted]}}	{{[redacted]}}	$0.00
7. Total Variable Costs	Sum of Lines 1-6	{{[redacted]}}	{{[redacted]}}	$139.39

As shown in Table 5, the STB's proposed changes increase URCS Phase III costs for the sample one-car movement by 7.5 percent.[35] Nowhere in *EP431-4* has the Board attempted to assess whether adjustments of that magnitude are accurate. The Board merely assumes they are accurate because they were derived using the Board's new cost curve.

For small shippers of regulated traffic, the practical result of the change will be increases in the regulated rate floor and a diminished ability to challenge the reasonableness of rates charged to them, despite the fact that the railroads will incur no actual cost increases for these shipments.

[34] Workpaper "EP 431 2016_Impact of UT Definition on Single Car.xlsx" at tab "Table 2 for VS."
[35] $1,999.95 ÷ $1,860.56.

B. Rate Case Benchmarks

In discussing how it would implement its proposed changes to the URCS calculations, the STB acknowledges that its URCS adjustment proposals would impact calculations that rely upon URCS cost information from multiple years.[36] This would mean that calculations that use multiple years of data, including comparison group samples used in the STB's Three Benchmark maximum reasonable rate methodology ("3BM"), would consist of a mix of data calculated using two different URCS methodologies until the timing of the Waybill Sample data caught up to the timing of the STB's proposed URCS methodology. The STB does not believe the mixing of variable costs developed under two different approaches is a significant concern because the proposed changes are, in the Board's view, simply refinements to the URCS variable costs that have been in use for over 20-years.[37] Instead, the STB proposes to apply its revised URCS variable cost calculations on a prospective basis only.

I disagree with the STB's conclusion that it should apply its revised URCS variable costs only prospectively, because the proposed revisions would adversely impact the determination of maximum rates under the STB's 3BM. The STB determines a rate's reasonableness under its 3BM methodology by comparing the R/VC ratio for the issue movement to the adjusted average R/VC ratio from a comparable group of traffic ("R/VC_{COMP}"). If the issue traffic R/VC ratio is higher than the adjusted R/VC_{COMP} ratio, then the Board deems the rate unreasonable and sets the rate at the level of the adjusted R/VC_{COMP} ratio.[38]

The parties to a 3BM case draw the data to develop the R/VC_{COMP} from multiple years of the STB's confidential Waybill Sample. However there is usually a two to three year time lag

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[36] *SNPR* at page 30 "The proposal here would impact calculations that use multiple years of URCS data."

[37] *Id.*

[38] See: STB Ex Parte No. 646 (Sub-No. 1), *Simplified Standards for Rail Rate Cases*, Served September 5, 2007 ("*Simplified Standards*"), at page 21.

between the Waybill Data used in the comparison group in the 3BM methodology and the challenged rate(s). This time lag occurs because it takes the STB, or the STB's contractor, several years to gather and analyze the Waybill Sample data, and to then develop the URCS Phase III variable costs for the sample movements.

In STB Docket No. 42101, *E. I DuPont de Nemours and Company v. CSX Transportation, Inc.*, served June 30, 2008 ("*DuPont 3BM*") for example, the parties developed the comparison group from 2002 to 2005 Waybill Sample data, but the issue rate was based on 2007 data.[39] CSXT, the defendant railroad in the *DuPont 3BM* case, argued that the Board should take into consideration the time lag between the data included in the R/VC_{COMP} and the issue rate because of what the railroad alleged were significant market changes and dynamics from increasing demand and tightening capacity, and from railroad cost inflation for shipments of chemical traffic.[40] CSXT argued that these changes led to an improper comparison between the R/VC_{COMP} and the issue traffic R/VC ratio.

The Board discounted any issues of the lag between the comparison group and the issue traffic in the *DuPont 3BM* case because it presumed the R/VC_{COMP} levels would not be impacted over time because price and cost levels changed in unison:

> In *Simplified Standards*, at 84-85, we addressed the issue and discussed problems associated with making adjustments to the comparison group's R/VC ratios to account for the lag in the data. First, we explained that in an R/VC ratio, price levels in the economy are reflected both in the numerator and denominator. Thus, the effects of price shifts on revenues should be largely offset by inflationary increases in costs, leaving the R/VC ratios generally unaffected. Moreover, the expansion ratio (RSAM÷ R/VC>180) will also reflect price shifts, creating an offsetting effect to any rate increase or decrease that could be attributable to regulatory lag.[41]

[39] See: *DuPont 3BM* at page 14.
[40] *Id.*
[41] *Id.*

Because the STB believed that both the cost and revenue components included in the R/VC_{COMP} calculation over the 5-year sample period essentially moved in harmony, the relative price mark-up over variable cost would not change, and there would be no need for a time lag adjustment.

Unlike the time lag issue in the *DuPont 3BM* case, the lag between the Waybill Sample data calculated using historic URCS costing methods and issue traffic R/VC ratios calculated using the URCS developed under the SNPR would have an impact. The Board's proposed URCS changes will substantially increase the variable costs associated with one-car movements. Increasing a movement's variable costs will lower the R/VC ratio for that movement, holding all else constant. The problem comes from comparing the R/VC ratio from an issue traffic movement developed using the Board's new URCS costing procedures to an R/VC_{COMP} developed under the current URCS methodologies. An R/VC_{COMP} for single-car movements developed under the Board's current URCS processes will have a higher ratio for the same traffic developed under the STB's proposed new URCS approach because under the current methodology, the URCS variable costs for the single-car movements will be lower.

This mismatch in URCS costs between the comparison group and the issue traffic would cause several problems. First, the mismatch could lead to a rate being found reasonable when it is not. For example, assume that an issue movement has an R/VC ratio of 350 percent when calculated under the current URCS variable costs, and a 330 percent R/VC ratio under the proposed new URCS costs. Further assume a comparison group is drawn from the STB's Waybill Sample and has an adjusted R/VC_{COMP} of 340 percent developed under the current URCS methodologies. When the issue traffic R/VC of 330 percent calculated under the proposed URCS methodologies is compared against the comparison group's R/VC_{COMP} of 340 percent using the current URCS approach, it appears that the rate is reasonable. However, this is just an illusion—if the issue traffic R/VC and the R/VC_{COMP} were calculated using the same URCS variable cost structures, the issue rate would be 350 percent, which would be unreasonable when compared to the 340 percent R/VC_{COMP}.

Second, even if the issue traffic R/VC developed from the STB's proposed new URCS method exceeds the R/VC_{COMP} from the comparison group developed using the existing methods, the prescribed rate would be set too high. For example, assume an issue movement with an R/VC ratio developed under the Board's proposed URCS approach has an R/VC ratio of 400 percent, and an R/VC_{COMP} from the comparison group developed using the current URCS equals 350 percent. The STB would find such a rate unreasonable because the issue R/VC exceeded the by R/VC_{COMP} by 50 percentage points, and would set the prescribed rate at 350 percent. In this case, if the R/VC_{COMP} were developed using the STB's new URCS procedures, it could be 330 percent. Therefore, instead of having its rate set at the proper comparable 330 percent level, the shipper's rate would be 20 percentage points higher than if the Board had used the same URCS costs to evaluate both the comparison group and the issue traffic.

The only way to avoid these mismatch issues is by using URCS variable costs calculated using the same methodologies on both sides of the equation. This would mean the STB's proposed plan of applying the new URCS variable costs only prospectively should be abandoned, and the Board should develop all variable costs on an apples to apples basis.

VII. Proposed Alternate Model

The Board's model is overly complicated and produces questionable results. Most notably, it pushes most switching costs below the system average for SC shipments of three to five cars, which is antithetical to the cost relationships currently reflected in URCS and the empirical studies on which they are based. It also pushes switching costs for MC shipments downward to where the resulting costs essentially reflect unit train operations.

If the Board must change the URCS model, I have developed a far simpler approach than the CWB model that results in a cost curve that is much better aligned with the cost relationships currently reflected in URCS and that reduces the step functions—where appropriate—per the Board's wishes.

In my model, I assumed that shipments of 56 cars or fewer moved in carload (SC and MC) service, while shipments of 57 or more cars moved in UT service, in keeping with my analysis described in Section IV above.

A. Industry Switching

For industry switching, I continue to apply the extant 75 percent efficiency adjustment to all UT shipments. For carload (SC and MC) shipments, I developed a simple logarithmic function in which the efficiency adjustment applied to shipments of 56 or fewer cars varies depending on the shipment size.[42] Specifically, the natural log of the shipment size is divided by the natural log of the minimum unit train shipment size (57 cars), and the resulting ratio is multiplied by the unit train efficiency adjustment to develop the shipment-size specific efficiency adjustment[43] (e.g., for a 10-car shipment, the efficiency adjustment equals [ln(10) ÷ ln(57) x

[42] For example, the efficiency adjustment for a 56-car shipment is greater than the efficiency adjustment for a 30-car shipment, which is greater than the efficiency adjustment for a two-car shipment. There is no efficiency adjustment applied to one-car shipments.

[43] Workpaper "EP431S4_SEMs LEPA2.xlsx" at orange tab "EA" range C15:C72.

0.75] or 0.4271.[44] After the variable efficiency adjustments are applied to all shipments,[45] the aggregate cost reduction (i.e., the residual) is totaled.[46]

Next, the total distribution events are developed for carload shipments on a variable basis as follows: The shipment size is divided by the maximum carload shipment size (56 cars), and the resulting ratio is applied to the aggregate SEM for shipments of that size.[47] Distribution events are then totaled for all shipments,[48] and the residual is divided by that total to develop the alternate make-whole factor.[49]

Finally, the alternate make-whole factor is allocated to the carload shipments, again on a variable basis using the ratio of shipment size to the maximum carload shipment size (56 cars),[50] thus ensuring the total system wide costs are captured.[51]

Figure 4 below[52] shows the results of applying my alternate model to Industry switching on a per-unit basis.

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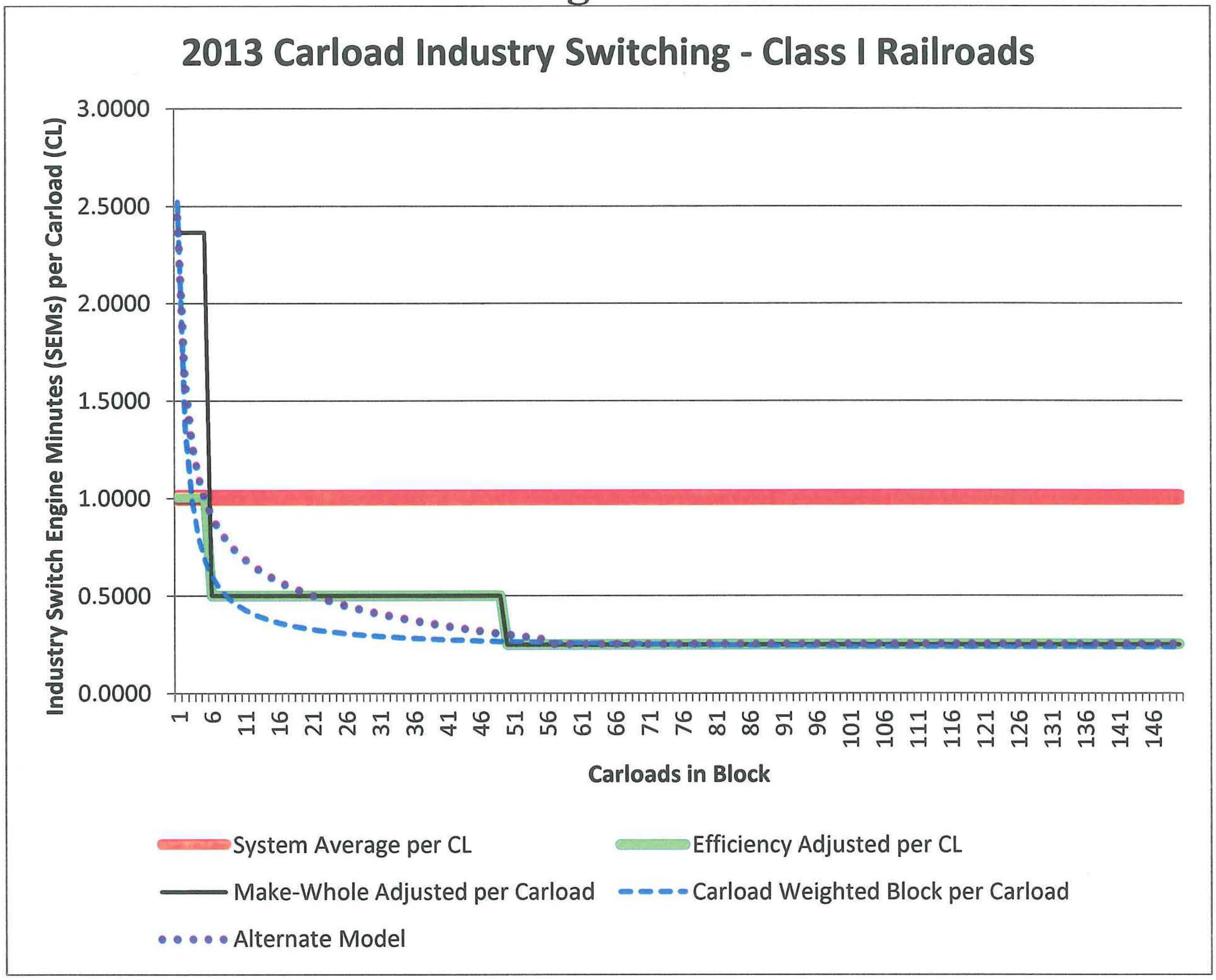
44 Workpaper "EP431S4_SEMs LEPA2.xlsx" at orange tab "EA" cell C25.
45 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" column W (highlighted orange.)
46 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" cell X2177 (highlighted orange.)
47 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" column Y (highlighted orange.)
48 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" cell Y2177 (highlighted orange.)
49 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" cell X2183 (highlighted orange.)
50 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" column Z (highlighted orange.)
51 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" compare cell Z2177 (highlighted orange) to cells O2177 and S2177.
52 Figure 4 exists at tab "Carload Impact Chart" of workpaper "EP431S4_SEMs LEPA2.xlsx" when the industry switching scenario is operative.

Figure 4



As shown in Figure 4 above, this model, like the Board's model, reflects economies of scale within the shipment groups. It also results in a cost curve that intersects the system average cost level near the five-car shipment size,[53] which is the point at which the empirical studies determined it should. In contrast, the Board's proposed CWB model assumes that three through five car SC shipments cost less than the system average to switch at industry, which runs counter to the empirical studies upon which the URCS Phase III adjustments are based.

Furthermore, in my alternate model, the cost curve for six- to 49-car shipments is much better aligned with the MC costs resulting from the current model. Specifically, the 50 percent

[53] Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Carload Impact Table" cell R16 (highlighted yellow.)

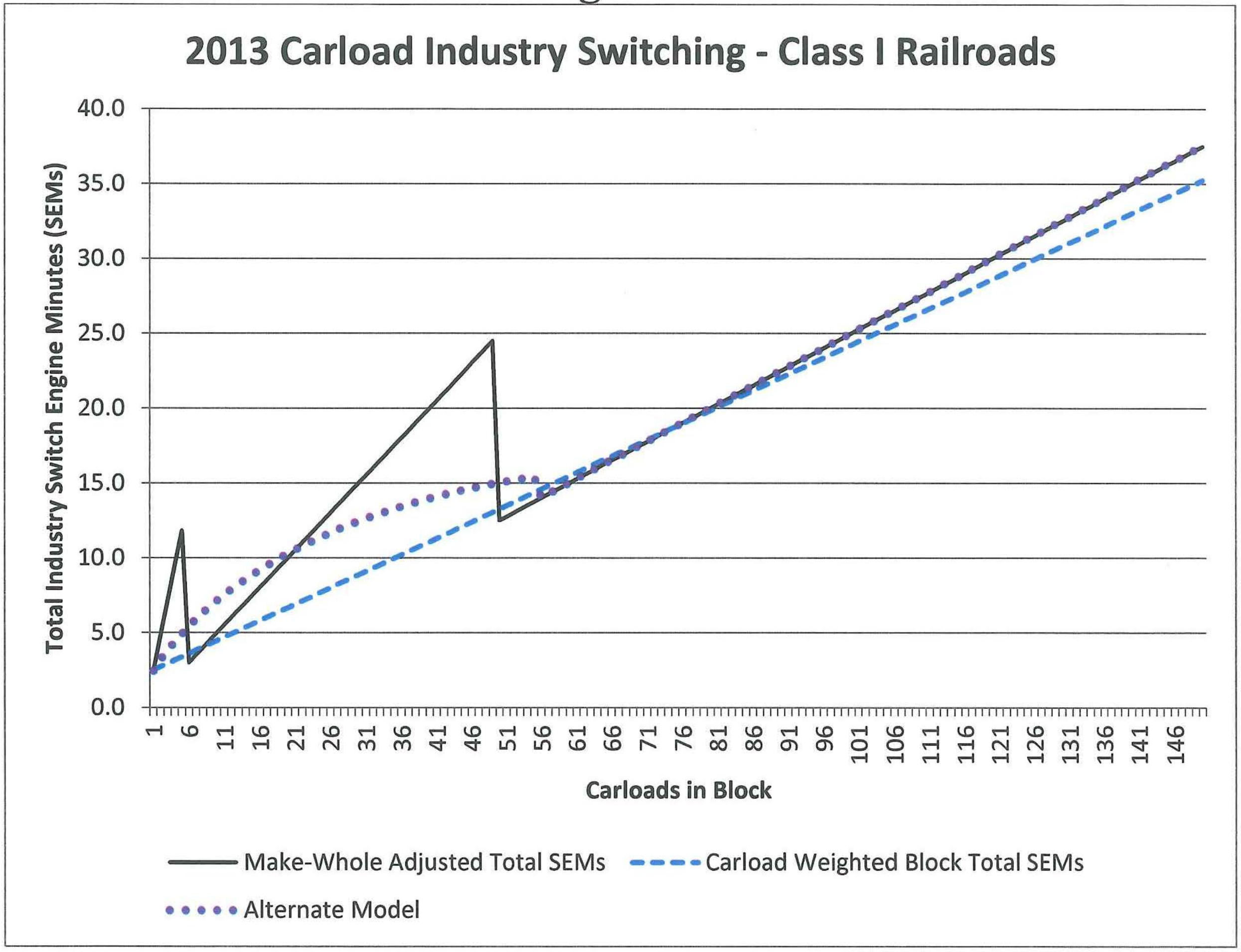
efficiency adjustment is shown to be achieved when shipment size equals 22 cars,[54] near the midpoint of the six to 49 car MC shipment strata. In the Board's proposed CWB model, the 50 percent efficiency adjustment is assumed to be achieved when shipment size equals nine cars, and is much greater than that for shipments of 10 to 49 cars. The proposed CWB model assumes that even small MC shipments essentially achieve UT industry switching efficiencies.

Although this alternate model still increases costs for one-car shipments compared to the current URCS Phase III model, it comes closer to maintaining the cost relationships reflected in URCS Phase III for one-car shipments. And although it results in a step function between one- and two-car shipments, the step is much less severe than the step produced by the Board's proposed CWB model. The slope of the cost curve is not as steep for small shipments.

Figure 5 below[55] shows the results of applying my alternate model to Industry switching costs on an aggregate basis.

[54] Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Carload Impact Table" cell R33 (highlighted yellow.)
[55] Figure 5 exists at tab "Carload Total SEMs Chart" of workpaper "EP431S4_SEMs LEPA2.xlsx" when the industry switching scenario is operative.

Figure 5



As shown in Figure 5 above, this model, unlike the Board's model, reflects economies of scale both within and between the shipment groups. The incremental costs associated with adding a car to a carload (SC or MC) shipment decrease as the shipment size increases, which reflects increasing efficiency of larger less-than-trainload shipments relative to smaller ones. For unit trains, the incremental cost curve is linear, which is logical because unit train efficiency is essentially homogenous in terms of terminal handling. The small step function between carload (SC and MC) and UT traffic is also logical because industry tracks at facilities where unit trains originate and terminate are designed and built to maximize loading and unloading operations (e.g., loop tracks.)

B. Interchange Switching

For interchange switching, I continue to apply the extant 50 percent efficiency adjustment to all UT shipments. For carload shipments, I retain the current URCS Phase III practice of applying no efficiency adjustment.[56] After the UT efficiency adjustments are applied,[57] the aggregate cost reduction (i.e., the residual) is totaled.[58]

As with industry switching, total distribution events are developed for carload shipments on a variable basis by dividing the shipment size by the maximum carload shipment size (56 cars), and applying the resulting ratio to the aggregate SEM for shipments of that size.[59] Distribution events are totaled for all shipments,[60] and the residual is divided by that total to develop the alternate make-whole factor.[61]

Finally, the alternate make-whole factor is allocated to the carload shipments, again on a variable basis using the ratio of shipment size to the maximum carload shipment size (56 cars),[62] thus ensuring the total system wide costs are captured.[63]

Figure 6 below[64] shows the results of applying my alternate model to interchange switching on a per-unit basis.

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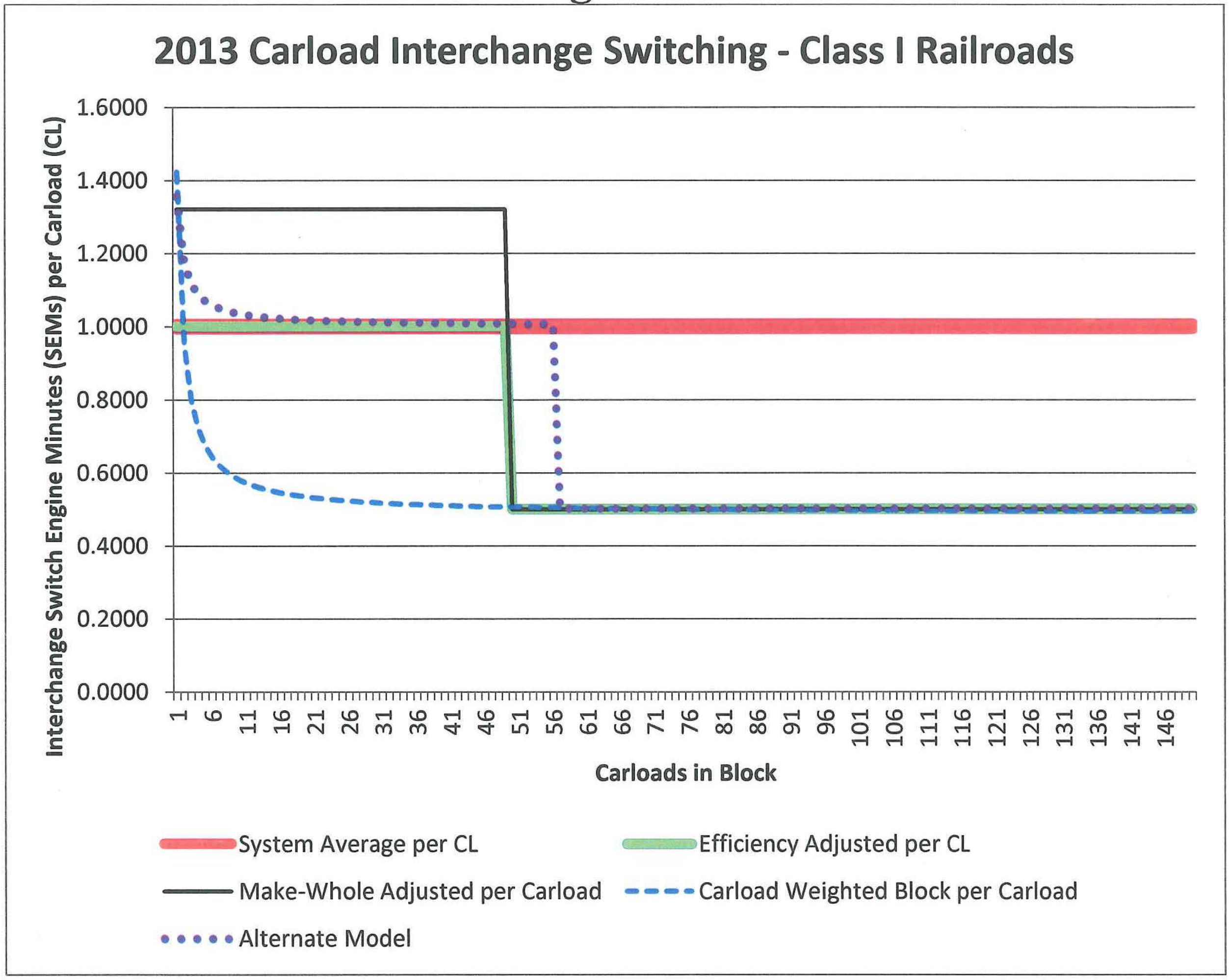
56 Workpaper "EP431S4_SEMs LEPA2.xlsx" at orange tab "EA" range D15:D72.
57 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" column W (highlighted orange.)
58 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" cell X2177 (highlighted orange.)
59 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" column Y (highlighted orange.)
60 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" cell Y2177 (highlighted orange.)
61 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" cell X2183 (highlighted orange.)
62 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" column Z (highlighted orange.)
63 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" compare cell Z2177 (highlighted orange) to cells O2177 and S2177.
64 Figure 6 exists at tab "Carload Impact Chart" of workpaper "EP431S4_SEMs LEPA2.xlsx" when the interchange switching scenario is operative.

Figure 6



As shown in Figure 6 above, this model, like the Board's model, reflects economies of scale within the carload (SC and MC) shipment groups—both the event and time components of the switching activity are reflected in the cost curve. It also results in a cost curve that intersects the system average cost level at the break point between carload (SC and MC) and UT shipments,[65] which is the point determined by the empirical studies. In contrast, the Board's proposed CWB model assumes all shipments of three or more cars cost less than the system average to switch at interchange, which runs counter to the empirical studies upon which the URCS Phase III adjustments are based. The Board's proposed dramatic shift in the cost structure

[65] Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Carload Impact Table" cell S67 (highlighted yellow.)

is demonstrated by comparing the vertical black line at 50 cars (empirical studies) to the near vertical blue dashed line that intersects the system average between 2 and 3 cars (CWB model.)

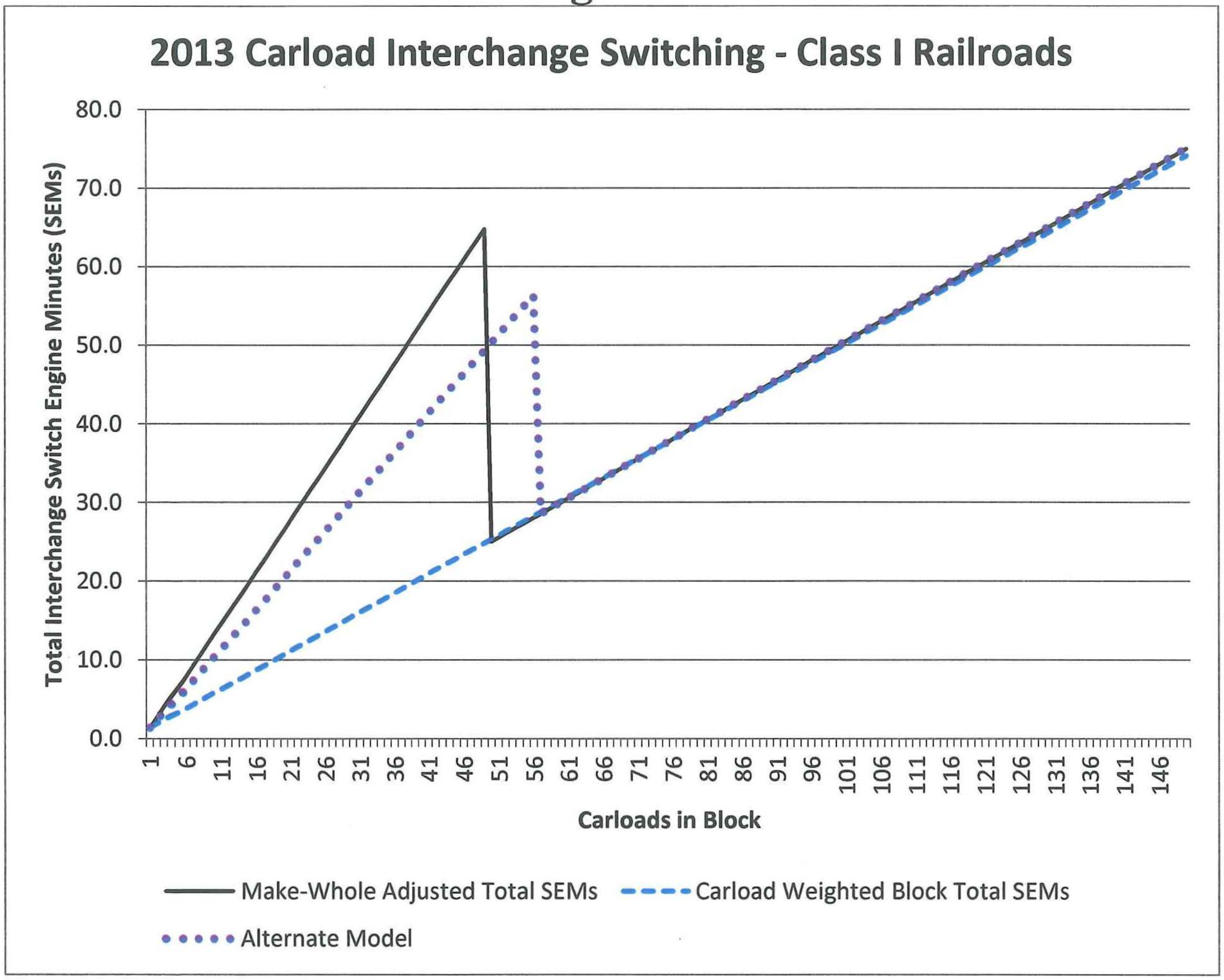
Furthermore, in my alternate model, the cost curve for six- to 49-car shipments is much better aligned with the MC costs resulting from the current model. Specifically, all carload shipments are shown to incur switching costs above the system average (although many move at just above the system average) in my model. This is shown by comparing the thick red line (system average) to the purple dotted line (my alternate cost curve) for carload shipments (under 57 cars.) In the Board's proposed CWB model, only one- and two-car shipments are assumed to cost more on a per-unit basis to switch at interchange than the system average, and most carload shipments are assumed to achieve nearly UT-level efficiencies.

Although this alternate model still increases costs for one-car shipments compared to the current URCS Phase III model, it comes closer to maintaining the cost relationships reflected in URCS Phase III for one-car shipments. And although it still results in step functions for small carload shipments, the steps are much less severe than the steps produced by the Board's proposed CWB model. The slope of the cost curve is not as steep for small shipments.

Figure 7 below[66] shows the results of applying my alternate model to interchange switching costs on an aggregate basis.

[66] Figure 7 exists at tab "Carload Total SEMs Chart" of workpaper "EP431S4_SEMs LEPA2.xlsx" when the interchange switching scenario is operative.

Figure 7



As shown in Figure 7 above, this model, unlike the Board's model, reflects economies of scale between the shipment groups. The step function between carload (SC and MC) and UT traffic is logical because interchange switching for a unit train involves only switching crews and perhaps power, whereas interchange switching for all carload shipments moving on manifest trains involves reclassifying and re-blocking all of the shipments for movement over the receiving carrier's system, regardless of the shipment size. The step in the cost curve reflects the fundamental differences in handling requirements at interchange.

C. I&I Switching

As discussed in Section V above, unit train shipments receive no I&I switching. Therefore, my model applies the extant 100 percent efficiency adjustment to all UT shipments (i.e., UT shipments are allocated zero I&I switching costs.) For carload shipments, I retain the current URCS Phase III practice of applying no efficiency adjustment.[67] After the UT efficiency adjustments are applied,[68] the aggregate cost reduction (i.e., the residual) is totaled.[69]

Next, the total distribution events are developed for carload shipments on a variable basis as was done for industry and interchange switching, the residual is divided by that total to develop the alternate make-whole factor.[70] The alternate make-whole factor is allocated to the carload shipments, again on a variable basis using the ratio of shipment size to the maximum carload shipment size (56 cars),[71] which ensures the total system wide costs is captured.[72]

Figure 8 below[73] shows the results of applying my alternate model to I&I switching on a per-unit basis.

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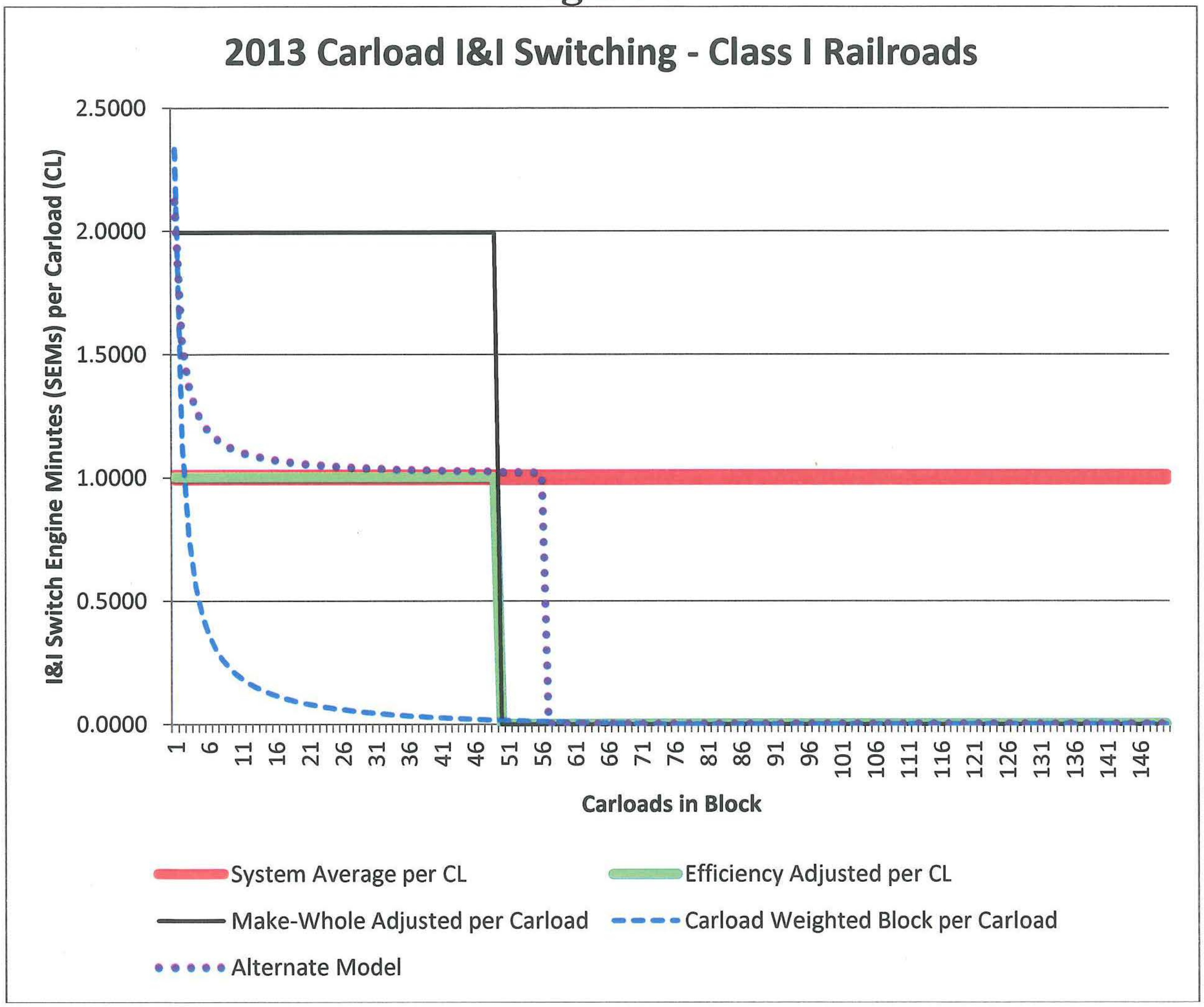
67 Workpaper "EP431S4_SEMs LEPA2.xlsx" at orange tab "EA" range E15:E72.
68 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" column W (highlighted orange.)
69 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" cell X2177 (highlighted orange.)
70 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" cell X2183 (highlighted orange.)
71 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" column Z (highlighted orange.)
72 Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" compare cell Z2177 (highlighted orange) to cells O2177 and S2177.
73 Figure 8 exists at tab "Carload Impact Chart" of workpaper "EP431S4_SEMs LEPA2.xlsx" when the I&I switching scenario is operative.

Figure 8



As shown in Figure 8 above, this model, like the Board's model, reflects economies of scale within the carload (SC and MC) shipment groups. This means the event and time components of the switching activity are accounted for. It also results in a cost curve that intersects the system average cost level at the break point between carload (SC and MC) and UT shipments,[74] the point at which the empirical studies determined it should. In contrast, the Board's proposed CWB model assumes all shipments of three or more cars incur less than system average I&I costs, which contradicts the empirical studies underlying the URCS Phase III

[74] Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Carload Impact Table" cell S67 (highlighted yellow.)

adjustments. As with interchange switching, the Board's proposed model results in a dramatic shift in the cost structure seen by comparing the vertical black line at 50 car shipments (empirical studies) to the near vertical blue dashed line that intersects the system average between two and three car shipments (CWB model.)

In my alternate model, the cost curve for six- to 49-car shipments (purple dotted line) remains above the system average (red line.) Although many move at just above the system average, this results in better alignment with the MC costs resulting from the current model. In the Board's proposed CWB model, only one- and two-car shipments are assumed to incur greater than system average cost on a per unit basis, and most carload (SC and MC) shipments are assumed to incur almost no I&I switching costs, which is not reflective of real world railroading.

For one-car shipments, my alternate model also comes closer to maintaining the cost relationships reflected in URCS Phase III, despite still increasing costs somewhat. The step functions for small carload shipments are also much less severe than the steps produced by the Board's proposed CWB model.

Figure 9 below[75] shows the results of applying my alternate model to I&I switching costs on an aggregate basis.

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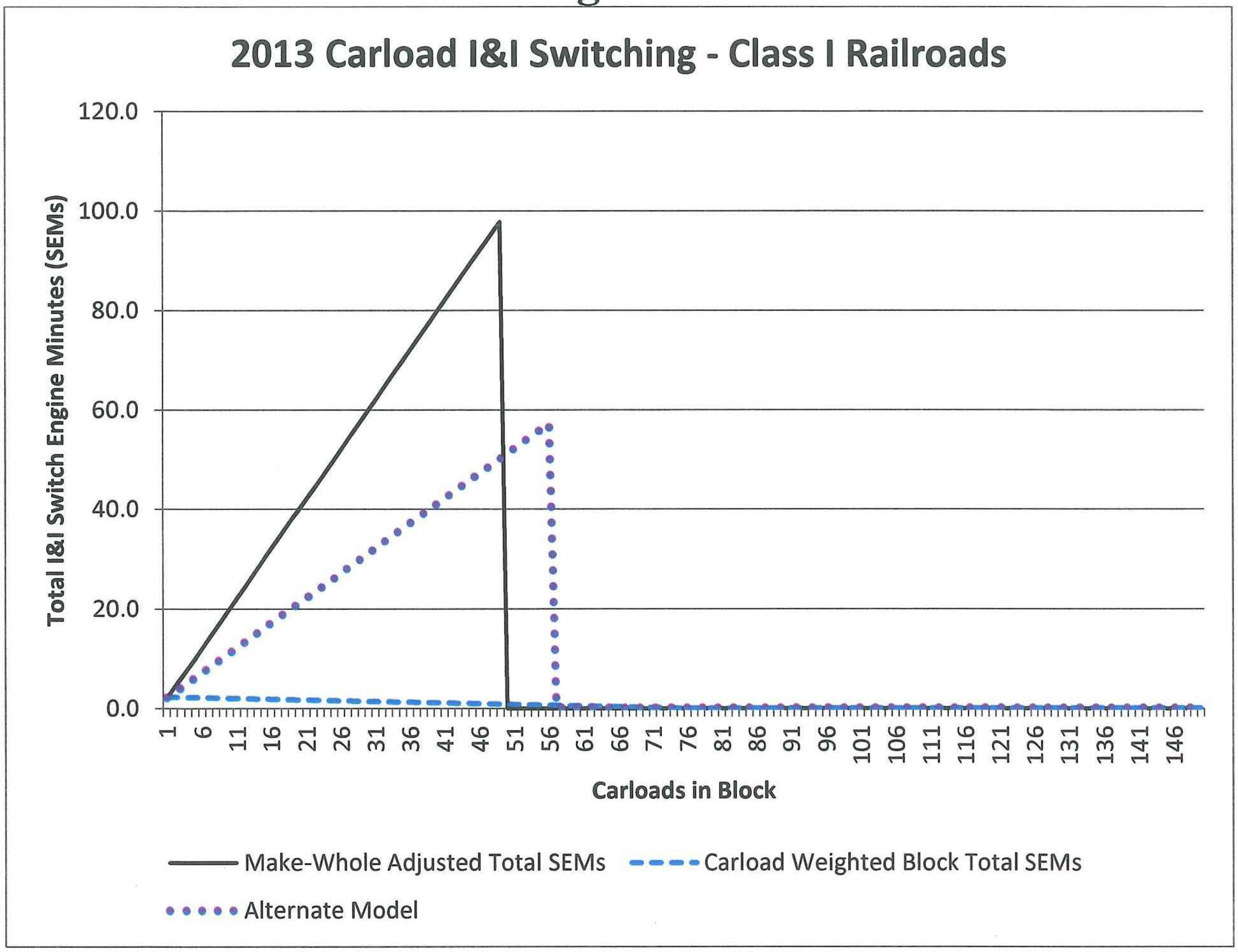
[75] Figure 9 exists at tab "Carload Total SEMs Chart" of workpaper "EP431S4_SEMs LEPA2.xlsx" when the I&I switching scenario is operative.

Figure 9



As shown in Figure 9 above, this model, unlike the Board's model, reflects economies of scale between the shipment groups. The step function between carload (SC and MC) and UT traffic is logical because there are no I&I switching costs for UT shipments, whereas every carload (SC and MC) shipment incurs I&I switching, and absent any demonstration to the contrary, one must assume I&I switching occurs at the same yards for all carload (SC and MC) shipment sizes, and the miles between I&I switch events is the same for all carload (SC and MC) shipments.

D. Inter-terminal and Intra-terminal Switching

Inter-terminal and Intra-terminal switching are handled in my model the same way as industry switching, where I continued to apply the extant 87.5 percent efficiency adjustment to all UT shipments. For carload (SC and MC) shipments, I developed a simple logarithmic function in which the efficiency adjustment applied to shipments of 56 or fewer cars varied depending on the shipment size.[76] The natural log of the shipment size is divided by the natural log of the minimum unit train shipment size (57 cars), and the resulting ratio is multiplied by the unit train efficiency adjustment to develop the shipment-size specific efficiency adjustment.[77] After the variable efficiency adjustments are applied,[78] the aggregate cost reduction (i.e., the residual) is totaled.[79]

Total distribution events are developed for carload shipments on a variable basis by dividing the shipment size by the maximum carload shipment size (56 cars), and the resulting ratio is applied to the aggregate SEM for shipments of that size.[80] Distribution events are then totaled for all shipments,[81] and the residual is divided by that total to develop the alternate make-whole factor.[82] The alternate make-whole factor is then allocated to the carload shipments on a variable basis using the ratio of shipment size to the maximum carload shipment size (56 cars),[83] ensuring the total system wide costs are captured.[84]

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[76] i.e., the efficiency adjustment for a 56-car shipment is greater than the efficiency adjustment for a 30-car shipment, which is greater than the efficiency adjustment for a two-car shipment. There is no efficiency adjustment applied to one-car shipments.
[77] Workpaper "EP431S4_SEMs LEPA2.xlsx" at orange tab "EA" range F15:G72.
[78] Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" column W (highlighted orange.)
[79] Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" cell X2177 (highlighted orange.)
[80] Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" column Y (highlighted orange.)
[81] Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" cell Y2177 (highlighted orange.)
[82] Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" cell X2183 (highlighted orange.)
[83] Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" column Z (highlighted orange.)
[84] Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Calculations" compare cell Z2177 (highlighted orange) to cells O2177 and S2177.

My alternate model produces a cost curve for Inter-terminal and Intra-terminal switching similar to the Industry switching cost curve shown in Figure 4 above, and reflects economies of scale within the shipment groups. It also results in a cost curve that intersects the system average cost level closer to the five-car shipment size,[85] which is the point at which the empirical studies determined it should, than the Board's proposed CWB model.

The cost curve for six- to 49-car shipments is also better aligned with the MC costs resulting from the current model. Specifically, the 50 percent efficiency adjustment is achieved when shipment size equals 12-14 cars,[86] compared to four to five cars in the Board's proposed CWB model, which assumes that even small MC shipments essentially achieve UT inter-terminal and intra-terminal switching efficiencies. This alternate model comes closer to maintaining the cost relationships reflected in URCS Phase III for carload (SC and MC) shipments than the Board's proposed CWB model.

E. Station Clerical

The Station Clerical cost function in URCS Phase III already includes a shipment and a carload component in its weighting formula, so to some extent it already reflects economies of scale within and between shipment types. In my alternate model, I aligned the station clerical cost curve with the industry switching cost curve, based on the theory that cars switched at industry together would be billed and processed together.[87]

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[85] Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Carload Impact Table" cell U15 and V14 (highlighted yellow.)

[86] Workpaper "EP431S4_SEMs LEPA2.xlsx" at tab "Carload Impact Table" cell U25 and V23 (highlighted yellow.)

[87] Workpaper "EP431S4_SEMs LEPA2.xlsx" at orange tab "EA" range H15:H72.

VIII. Conclusion

The Board claims that, "[t]he changes proposed here can be properly supported by reasonable economic judgments based on sound principles of cost causation and cost allocation."[88] But step functions in the cost curve between shipment types are often logical and reflective of railroad operating practices (e.g., I&I and interchange switching costs *are* significantly greater for carload (SC and MC) shipments than they are for UT shipments due to the very nature of the operations.)

The make-whole adjustment and the corresponding efficiency adjustments, while not perfect, are meant to reflect the economies of scale inherent in the railroad industry. There are significant differences in the way different shipment types are handled by the railroads. Moving UT traffic is significantly more efficient than moving MC traffic, which is marginally more efficient than moving SC traffic. The Board has made no demonstration that the three shipment types should be abandoned, but its model does just that. In fact, the Board's proposed CWB model creates a theoretical world where those distinctions do not exist. In its attempt to eliminate step functions between shipment types, the Board has essentially discarded the shipment types altogether, and instead offers a model in which railroad shipments can all be placed on the same smooth cost continuum.

However, the continuum proposed by the Board is represented by a nearly kinked cost curve where there are substantial unit cost differentials for small shipments and very small differentials for larger shipments. There is no practical difference between a one-car SC shipment and a two-car SC shipment in terms of the way they are handled between origin and destination, but the Board's proposed model imposes a substantial unit cost step between one and two car shipments. There is a significant difference in efficiency associated with handling cars

[88] *SNPR* at 6.

in carload (SC and MC) service compared to UT service, but the Board's model imposes the same incremental costs when adding a car to a one-car shipment as it does when adding a car to a 149-car shipment.

The efficiency and make-whole adjustments are meant to recognize that certain operations are more efficient than the system average while others are less efficient than the system average. The Board's goal should be to determine the extent to which the operations are more or less efficient than system average, but it should not discard the groups entirely or disregard the side of the equation on which they have been placed based on empirical studies. It is likely that a sliding scale within the carload (SC and MC) groups, if calibrated correctly, would be more reflective of scale economies within the groups than the one-size-fits-all adjustments that are made in the current model. However, absent compelling proof that the efficiency and make-whole adjustments misallocate costs, the Board should not abandon them in favor of an untested theoretical construct.

As in 2013, I continue to have strong reservations about the Board's move to implement major changes to the URCS cost allocation formulae without first conducting empirical studies to validate the accuracy of the proposed changes. However, if the Board insists on implementing a change, there are better and less complicated ways to do so than the Board's proposed CWB framework. As shown in Section VII above, the model I propose would accomplish the Board's stated goal of minimizing step functions in the cost curves—except where they accurately reflect steps in operational efficiency—while coming much closer to retaining the cost relationships currently reflected in URCS Phase III, which were developed based on empirical studies.

VERIFICATION

COMMONWEALTH OF VIRGINIA)
)
CITY OF ALEXANDRIA)

I, ROBERT D. MULHOLLAND, verify under penalty of perjury that I have read the foregoing Verified Statement of Robert D. Mulholland, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Robert D. Mulholland

Sworn to and subscribed before
me this 11th day of October, 2016

Diane R. Kavounis
Notary Public for the State of Virginia

My Commission Expires: November 30, 2016
Registration Number: 7160645

STATEMENT OF QUALIFICATIONS

ROBERT D. MULHOLLAND

My name is Robert D. Mulholland. I am an economist and a Senior Vice President of the economic consulting firm of L. E. Peabody & Associates, Inc. The firm's offices are located at 1501 Duke Street, Suite 200, Alexandria, Virginia 22314, 760 E. Pusch View Lane, Suite 150, Tucson, Arizona 85737, and 7 Horicon Avenue, Glens Falls, New York 12801.

I am a graduate of George Mason University's School of Public Policy, from which I obtained a Master's degree in Transportation Policy, Operations & Logistics, and Bowdoin College, from which I obtained a Bachelor of Arts degree in Government and Legal Studies. I have been employed by L. E. Peabody & Associates, Inc since 2008 and from 1995-2004. From 2004-2006, I was the staff economist for the Office of Freight Management and Operations of the Federal Highway Administration ("FHWA") of the United States Department of Transportation ("USDOT"). From 2006-2008, I worked for ICF International as a consultant in the transportation group.

L. E. Peabody & Associates, Inc. specializes in economic and operations analysis of the freight rail industry. I have directed and conducted economic studies and prepared reports for freight carriers, shippers, federal agencies, the U.S. Congress, various associations, and other public bodies dealing with transportation and related economic issues. I have organized and directed traffic operations and cost analyses in connection with single and multiple car movements and unit train shipments of various commodities, rail facilities analyses, rate and revenue division analyses, and other studies dealing with

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freight transportation markets for many commodities over various surface modes throughout the United States.

I have developed evidence containing base year traffic, revenues, and revenue divisions, forecasts of those volumes and revenues, train lists supporting the movement of selected traffic, and operating statistics associated with their movement, for hypothetical stand-alone railroads ("SARR") in several Surface Transportation Board ("STB" or "Board") proceedings dealing with the calculation of maximum reasonable rail transportation rates for coal and chemical shippers.

I have presented written testimony before the STB in several Ex Parte proceedings, including: Docket No. EP 706, related to reporting requirements for PTC-related expenses and investments; Docket No. Docket No. Ex Parte 715, related to the inclusion of cross-over traffic and the development of revenue divisions for that traffic in rate reasonableness proceedings, Docket No. EP 661 (Sub-No. 2), related to the application of the "Safe Harbor" provision to railroad fuel surcharge programs, Docket No. EP 733, related to expediting rate cases, and the 2013 proceedings in this Docket No. EP 431 (Sub-No. 4), related to proposed adjustments to the STB's Uniform Railroad Costing System ("URCS") mode.

I have developed evidence and presented written testimony containing fuel cost calculations for multiple commodities in an STB proceeding dealing with the determination of reasonable practices related to fuel surcharges.

As a result of my extensive experience since 1995, including participation in and support of various proceedings before the STB and other government bodies, I have become thoroughly familiar with the major rail carriers in the United States. This

STATEMENT OF QUALIFICATIONS

familiarity extends to subjects of railroad operations, accounting procedures, cost structure, pricing practices, revenue collection, and capacity utilization. I am also very familiar with the Class I railroads' traffic, revenue, and operations databases.

I developed a series of reports evaluating and critiquing the Federal Railraod Administration's ("FRA") benefit-cost analyses (BCA") related to the implementation of Positive Train Control ("PTC") systems on the Class I carriers' rail systems.

I have developed numerous variable cost calculations utilizing the various formulas employed by the STB for the development of variable costs for common carriers, with particular emphasis on the basis and use of the Uniform Railroad Costing System ("URCS"). I have utilized URCS costing principles since the beginning of my career with L. E. Peabody & Associates Inc. in 1995.

I have conducted multiple studies of rail fuel surcharge revenue collection formulae relative to fuel consumption and costs, and I have developed studies analyzing delivered fuel prices to electric utilities using Federal Energy Regulatory Commission ("FERC"), Energy Information Administration ("EIA"), and related data.

I have supported the negotiation of transportation contracts between shippers and railroads. Specifically, I have conducted studies concerning the relative efficiency and costs of railroad operations over multiple routes, transportation rates based on market conditions and carrier competition, movement-specific service commitments, and specific market- and cost-based rate adjustment provisions.

In the Western rail merger that resulted in the creation of the present Union Pacific Railroad Company, I reviewed the railroads' applications including their supporting traffic, cost and operating data and developed detailed evidence supporting

STATEMENT OF QUALIFICATIONS

requests for conditions designed to maintain the competitive rail environment that existed before the proposed merger. Following the merger, I developed studies analyzing its impact on system traffic flows and transit times.

I have inspected and studied railroad terminal facilities used in handling various commodities to collect data that were used as a basis for the determination of traffic and operating characteristics for specific movements handled by rail.

While employed at FHWA, I was a member of the USDOT inter-agency working group that drafted the National Freight Policy. In addition, I served on the USDOT Freight Gateway Team, a group headed by the Undersecretary for Policy and composed of one representative from each of the surface modal agencies.

While employed by ICF International, I directed and conducted numerous analyses of the rail and trucking industries for federal transportation agencies including the Federal Railroad Administration ("FRA"), the Federal Motor Carrier Safety Administration (“FMCSA”), and the FHWA, including analyses of the current rail and trucking industries and forecasts of future trends in both industries.